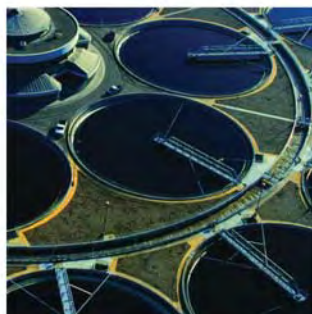


Rockwell Automation Library of Process Objects: Variable Speed Drive (P_VSD)

Version 3.1



Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.



WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.



ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

Labels may also be on or inside the equipment to provide specific precautions.



SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.



BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.



ARC FLASH HAZARD: Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

Preface	Software Compatibility and Content Revision.....	5
	Additional Resources	6
Variable Speed Drive (P_VSD)	Guidelines	10
	Functional Description	11
	Required Connections for a Hardwired Drive.....	12
	Required Files.....	14
	Controller File	14
	Visualization Files	14
	Controller Code	16
	Variable Speed Drive InOut Structure.....	16
	Variable Speed Drive Input Structure	17
	Variable Speed Drive Output Structure.....	23
	Variable Speed Drive Local Configuration Tags.....	28
	Operations	29
	Modes	29
	Alarms.....	30
	Simulation.....	31
	Execution.....	32
	Programming Example	33
	Display Elements.....	34
	State Indicators	37
	Status/Quality Indicators	37
	Maintenance Bypass Indicator	39
	Mode Indicators.....	39
	Alarm Indicators	40
	Using Display Elements.....	41
	Quick Display	42
	Faceplate	43
	Operator Tab	43
	Maintenance Tab.....	49
	Engineering Tab.....	52
	Diagnostics Tab	65
	Trends.....	66
	Alarms Tab	67
	Variable Speed Drive Faceplate Help	69

Notes:

This document is updated throughout for version 3.1 of the Rockwell Automation Library of Process Objects. Changes for this revision are marked by change bars shown in the right margin.

Software Compatibility and Content Revision

Table 1 - Summary of Changes

Topic	Page
Changed title from 'PlantPAx® Library of Process Objects' to 'Rockwell Automation Library of Process Objects'	Front Cover
Changed version of Rockwell Automation Library of Process Objects from 3.0 to 3.1.	5, 14
Changed references to Knowledgebase Answer ID 62682 to Product Compatibility and Download Center	5, 14
Additional Resources - added publications SYSLIB-RM004, SYSLIB-RM007, SYSLIB-RM009, and SYSLIB-RM010 to table	6
Functional Description - added 'Required Connections for a Hardwired Drive' section	12
Visualization Files: added Important note concerning the order files are to be imported Types table - added Optional Graphic Displays section to table	14
Controller Code - added Variable Speed Drive InOut Structure section and explanation of Fault Code Lists	16
Input Parameters table: added 'Alias For' column and aliases added MCmd_Acq and MCmd_Rel parameters 'Cfg_IOFaultSeverity' - changed level 4 alarm severity from 'Highest' to 'Urgent' changed Alarm Severity from 1...4 to 1...1000 changed descriptions for 'PCmd_Acq', 'PCmd_Rel', 'PCmd_Lock', 'PCmd_Unlock', 'PCmd_Reset', 'PCmd_<Alarm>Ack', 'PCmd_<Alarm>Suppress', 'PCmd_<Alarm>Unsuppress', and 'PCmd_<Alarm>Unshelve'	17
Output Parameters table: added 'SrcQ_', 'Nrdy_', 'Err_', 'Ack_', and 'Alm_', parameter descriptions to bullet list added 'Alias For' column and aliases added 'Sts_ShedResetReqd' and 'Sts_MAcqRcvd' parameters changed data type for 'Val_Mode' from DINT to SINT 'Val_Notify' - changed level 4 alarm severity from 'Highest' to 'Urgent'	23
Operations - added Simulation section	31
Programming Example - added section	33
Status/Quality Indicators table - added symbols and descriptions for Speed Ref Limited to Min/Max, At Target Speed, Accelerating, and Decelerating	37
Faceplate - added information about contents of faceplate title bar	43
Operator tab: Added status indicator table for interlocks and permissives Added alarm locations image	47 48
Diagnostics tab - added section	65
Trends tab - added section	66

For the latest compatible software information and to download the Rockwell Automation Library of Process Objects, see the Product Compatibility and Download Center at <http://www.rockwellautomation.com/rockwellautomation/support/pcdc.page>.

For general library considerations, see Rockwell Automation Library of Process Objects Reference Manual, publication [PROCES-RM002](#).

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Table 2 - Additional Resources

Resource	Description
PlantPAx Process Automation System Selection Guide, publication PROCES-SG001	Provides information to assist with equipment procurement for your PlantPAx system.
PlantPAx Process Automation System Reference Manual, publication PROCES-RM001	Provides characterized recommendations for implementing your PlantPAx system.
Rockwell Automation Library of Process Objects Reference Manual, publication PROCES-RM002	Provides general considerations for the PlantPAx system library of process objects.
FactoryTalk® View Machine Edition User Manual, publication VIEWME-UM004	Provides details on how to use this software package for creating an automation application.
FactoryTalk View Site Edition User Manual, publication VIEWSE-UM006	Provides details on how to use this software package for developing and running human-machine interface (HMI) applications that can involve multiple users and servers, distributed over a network.
PowerFlex® 70 Adjustable Frequency AC Drives User Manual, Publication 20A-UM001	Provides basic information needed to start-up, program, and troubleshoot the PowerFlex 70 Adjustable Frequency AC Drive.
PowerFlex 700 Adjustable Frequency AC Drives User Manual, Publication 20B-UM001	Provides basic information needed to start-up, program, and troubleshoot the PowerFlex 700 Adjustable Frequency AC Drive.
PowerFlex 700H Adjustable Frequency AC Drives Programming Manual, Publication 20C-PM001	Provides basic information needed to start-up, program, and troubleshoot the PowerFlex 700H Adjustable Frequency AC drive.
PowerFlex 700S Adjustable Frequency AC Drives Phase II Programming Manual, Publication 20D-PM001	Provides information needed to start-up, program, and troubleshoot the PowerFlex 700S Phase II Adjustable Frequency AC drives.
PowerFlex Digital DC Drive User Manual, Publication 20P-UM001	Provides basic information required to install, start-up, and troubleshoot the PowerFlex DC drive.
PowerFlex 4 Adjustable Frequency AC Drive User Manual, Publication 22A-UM001	Provide basic information needed to install, start-up, and troubleshoot the PowerFlex 4 Adjustable Frequency AC Drive.
PowerFlex 40 Adjustable Frequency AC Drive User Manual, Publication 22B-UM001	Provides basic information needed to install, start-up, and troubleshoot the PowerFlex 40 Adjustable Frequency AC Drive.
PowerFlex 400 Adjustable Frequency AC Drive for Fan & Pump Applications User Manual, Publication 22C-UM001	Provides basic information needed to install, start-up, and troubleshoot the PowerFlex 400 Adjustable Frequency AC Drive.
PowerFlex 40P Adjustable Frequency AC Drive User Manual, Publication 22D-UM001	Provides basic information needed to install, start-up, and troubleshoot the PowerFlex 40P Adjustable Frequency AC Drive.
PowerFlex 4M Adjustable Frequency AC Drive User Manual, Publication 22F-UM001	Provides basic information needed to install, start-up and troubleshoot the PowerFlex 4M Adjustable Frequency AC Drive.
Rockwell Automation Library of Process Objects: Common Alarm Block (P_Alarm) Reference Manual, publication SYSLIB-RM002	Details how to monitor an input condition to raise an alarm. Information includes acknowledging, resetting, inhibiting, and disabling an alarm. Generally the P_Alarm faceplate is accessible from the Alarms tab.

Table 2 - Additional Resources

Resource	Description
Rockwell Automation Library of Process Objects: Interlocks with First Out and Bypass (P_Intlk) Reference Manual, publication SYSLIB-RM004	Explains how to collect (sum up) the interlock conditions that stop or de-energize a running or energized piece of equipment or prevent it from starting or being energized.
Rockwell Automation Library of Process Objects: Common Mode Block (P_Mode) Reference Manual, publication SYSLIB-RM005	Explains how to choose the Mode (owner) of an instruction or control strategy. The Mode instruction is usually embedded within other instructions to extend their functionality. It is possible to use a standalone Mode instruction to enhance a program where modes are wanted.
Rockwell Automation Library of Process Objects: Permissives with Bypass (P_Perm) Reference Manual, publication SYSLIB-RM007	Details how to collect permissive conditions to start a piece of equipment.
Rockwell Automation Library of Process Objects: Restart Inhibit for Large Motor (P_ResInh) Reference Manual, publication SYSLIB-SYSLIB-RM009	Explains how to protect a large motor from damage caused by repeated starts.
Rockwell Automation Library of Process Objects: Run Time and Starts (P_RunTime) Reference Manual, publication SYSLIB-RM010	Explains how to accumulate the total run time and count of starts for a motor or other equipment.

You can view or download publications at <http://www.rockwellautomation.com/literature/>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Notes:

Variable Speed Drive (P_VSD)

The P_VSD (Variable Speed Drive) Add-On Instruction is used to operate one variable speed motor by using a drive (AC variable frequency or DC) in a variety of modes, monitoring for fault conditions.

Add-On Instruction

P_VSD
Variable Speed Drive

☐ Ref_FaultCodeList	☐ ?
☐ Inp_SpeedFdbk	☐ Out_SpeedRef
☐ Inp_Datalink	☐ Out_Datalink
☒ Inp_Ready	☐ Out_Stop
☒ Inp_Running	☐ Out_Start
☒ Inp_CommandDir	☐ Out_Jog
☒ Inp_ActualDir	☐ Out_ClearFault
☒ Inp_Accelerating	☐ Out_Fwd
☒ Inp_Decelerating	☐ Out_Rev
☒ Inp_Alarm	☐ Val_SpeedRef
☒ Inp_Faulted	☐ Val_SpeedFdbk
☒ Inp_AtSpeed	☐ Val_InpDatalink
☒ Inp_FwdPermOK	☐ Val_OutDatalink
☒ Inp_RevPermOK	☐ Val_Fault
☒ Inp_RevNBPermOK	☐ Sts_Stopped
☒ Inp_IntlkOK	☐ Sts_Starting
☒ Inp_NBIntlkOK	☐ Sts_Running
☒ Inp_Hand	☐ Sts_Stopping
☒ Inp_Ovrd	☐ Sts_Jogging
☐ Inp_OvrdCmd	☐ Sts_ActualDir
☒ Inp_Reset	☐ Sts_Alarm
	☐ Sts_AtSpeed
	☐ Sts_SpeedLimited
	☐ Sts_Available
	☐ Sts_Err
	☐ Sts_Hand
	☐ Sts_Maint
	☐ Sts_Ovrd
	☐ Sts_Prog
	☐ Sts_Oper

Faceplate

Global Object

Guidelines

Use this instruction when you need to operate a motor connected to a variable speed drive. The drive can be an AC (variable frequency) or DC drive, and can be connected via an I/O or control network (intelligent drive) or via hard-wired analog and discrete I/O.

This instruction is designed to work with all currently-available and many legacy Allen-Bradley® drives, including Bulletin 1336 Plus™ II, Bulletin 1395, PowerFlex 4/40/70/700/7000 and PowerFlex DC Drives. This instruction also works with drives and other variable-speed motor control products via discrete I/O for the start/stop/running signals and analog I/O for the speed reference and speed feedback signals.

Do **not** use this instruction in these situations:

- You are using a PowerFlex 753 or PowerFlex 755 drive. The P_PF52x, P_PF753, and P_PF755 Add-On Instructions provide enhanced diagnostics and monitoring for these drive families.
- You are using a PowerFlex 523 or PowerFlex 525 drive. The P_PF52x Add-On Instruction provides enhanced diagnostics and monitoring for these drive families.
- You need to operate a single-speed motor (running/stopped only). Use the P_Motor instruction instead.
- You need to operate a two-speed motor (fast/slow/stopped only). Use the P_Motor2Spd instruction instead.
- You need to operate a simple reversing motor (forward/reverse/stopped only). Use the P_MotorRev instruction instead.
- You need to operate a motor with multiple discrete speeds. You need specific logic for this motor. The P_VSD instruction is designed for motors with continuously variable (analog) speed, not multiple discrete speed selections. The P_D4SD instruction can be suitable for these motors.

Functional Description

The P_VSD instruction provides the following capabilities:

- Ownership of the drive through the standard P_Mode Add-On Instruction and modes. Modes of operation are described below.
- Ability to start and stop the drive and motor, control the drive speed (via speed reference), and monitor the drive run status and speed feedback to verify the drive is running or stopped.
- Alarms and drive shutdown for Fail to Start and Fail to Stop if the feedback does not follow the commanded state within a configured amount of time. Whether or not the drive has run feedback can be configured at the engineer level. Whether or not to use the run feedback can be configured at the maintenance level.
- Scaling of the speed reference from user (engineering) units, such as RPM, to drive units, such as 32,767 = maximum frequency.
- Scaling of the speed feedback from drive units to user (engineering) units and display with suitable units of measure text.
- Optional setting (by Program or Operator) of an output datalink and scaling of this setting from engineering units (such as ramp time in seconds) to drive raw units.
- Optional reading of an input datalink and scaling of this value from drive raw units to engineering units (such as amperes) for display on the HMI.
- Reading from the drive and displaying a fault code, and displaying a text fault description based on the fault code.
- Indication of Accelerating, Decelerating, At Speed, and Warning or Alarm status as received from the drive.
- Optional capability to support reversing drives, with commands for forward and reverse rotation and display of actual rotation direction.
- Input and alarm for drive fault condition and an output to send a drive fault reset to the drive.
- Configurable time to pulse the drive fault reset output when a reset command is received.
- Above inputs and outputs formatted to work with any drives commonly used in the Process industries, including, but not limited to, 1336 Plus II, 1395, PowerFlex 4/40/70/700/7000 and PowerFlex DC, in a form that still allows use with non-Allen-Bradley drives via hard-wired I/O.
- Permissives (bypassable and non-bypassable) that are conditions that allow the drive to start, and interlocks (bypassable and non-bypassable) that are conditions that stop the drive as well as prevent starting.
- Alarm when an interlock stops the drive.
- Capability for maintenance personnel to bypass the bypassable permissives and interlocks.
- Capability for maintenance personnel to disable (soft lock out) the drive.

IMPORTANT This capability is not a substitute for hard lockout/target (LOTO) procedures.

- Monitors I/O communication, and alarms and shuts down on a communication fault.

- Operates in Hand, Maintenance, Override, Program, and Operator modes.
- Available status for use by automation logic to determine if other program logic can start and stop the motor.
- Monitor an I/O fault input, alarm on an I/O fault.
- I/O fault condition can optionally de-energize the outputs to the drive, requiring a reset.
- Override State input that determines whether the override is to run or stop the drive (default = stop) and, if the drive is to run, an override speed reference and direction. See modes below for more information on override.
- Simulation capability, in which the outputs to the drive are kept de-energized, but the object can be manipulated as if a working drive were present, including a basic ramp-up of speed feedback value on starting and ramp-down on stopping. The simulated ramp-up-to-speed time is configurable. This capability is often used for activities such as system testing and operator training.

Required Connections for a Hardwired Drive

[Table 3](#) shows the minimum set of connections to make the P_VSD instruction work with an Allen-Bradley or third-party drive, assuming the drive is non-reversing.

The P_VSD instruction is written around the typical command and status words, speed reference, and speed feedback used with Allen-Bradley PowerFlex drives. Pins are individually available to connect to whatever drive you have, 1336 Plus™ II, PowerFlex 4, PowerFlex 40, PowerFlex 70EC, PowerFlex 700, PowerFlex 7000, and so on. These can connect over the EtherNet/IP network (in which case the signals have similar, but not identical names), or over DeviceNet, ControlNet, any other network, or over hardwired I/O.

Table 3 - Using P_VSD Instruction with a Non-reversing Hardwired (Allen-Bradley or third-party) Drive

Parameter	Description
Inputs	
Inp_SpeedFdbk	We recommend that you set this value to represent the drive speed; otherwise, the display indicates zero speed. The value can be live speed feedback or it can be a loopback of the speed reference output to the drive. Make sure you set 'Assume Data Available' if this is a loopback of the output used in Function Block Diagram (FBD) logic.
Input_Ready	This parameter must be set to 1 for the instruction to allow starting the drive. It's best if Inp_Ready is actively written to '1'. In FBD, connect an IREF that is a '1' (program constant). In LD, code an unconditional OTL to this parameter. This parameter can be 'left at' 1, but if it ever gets zeroed, the Add-On Instruction does not allow a start.
Inp_Running	This parameter must be wired from the run feedback, an IREF with the input bit or an XIC-OTE rung.

Table 3 - Using P_VSD Instruction with a Non-reversing Hardwired (Allen-Bradley or third-party) Drive

Parameter	Description
Inp_CommandDir, Inp_ActualDir	This parameter must be set to or left at 1 (forward). (See below for reversing drives.)
Inp_Accelerating, Inp_Decelerating, Inp_Alarm, Inp_Faulted, and Inp_AtSpeed	These parameters are optional. We recommend that you clear or leave at 0 any parameters that are not used, unless you have an input that indicates a drive fault (1=Fault, 0=OK). If you do have an input that indicates a drive fault, we recommend that you wire it to Inp_Faulted.
Outputs	
Out_SpeedRef	Connect to the (analog) output to the drive to set the speed.
Out_Run	If the discrete output is 1 to run and 0 to stop, use Out_Run and not Out_Start, Out_Stop, or Out_Jog. In FBD, you can expose the Out_Run pin (use the dialog box opened by the 'ellipsis') and hide the others. Then wire it to an OREF on the output to the drive. In LD, code an XIC of Out_Run and an OTE of the discrete output to the drive. If there are separate outputs for start and stop, wire both to Out_Start and Out_Stop.
Out_ClearFault	If you wired a Drive Fault input above and have an output to the drive to attempt to clear the fault, wire it to Out_ClearFault. Otherwise, leave this pin unconnected.
Other outputs	Other outputs can be left unconnected and unreferenced.

[Table 4](#) shows the minimum set of connections to make the P_VSD instruction work with an Allen-Bradley or a third-party drive, assuming the drive is reversing.

Table 4 - Using P_VSD Instruction with a Reversing Hardwired (Allen-Bradley or third-party) Drive

Parameter	Description
Inp_CommandDir	This parameter must properly reflect the commanded direction. Out_Fwd requests to set the drive to the forward direction, and Out_Rev requests to set the drive to the reverse direction. If the drive itself does not show the commanded direction, logic tied to Inp_CommandDir must be provided to show the result of the requests. This can be done by using a Set-dominant function block or a pair of rungs that set/latch Inp_CommandDir when Out_Fwd is 1 and clear/unlatch Inp_CommandDir when Out_Rev is 1.
Inp_ActualDir	Make sure this parameter reflects the actual rotation of the motor (1 = Forward, 0 = Reverse).
Inp_SpeedFdbk	This parameter must reflect a non-negative speed (absolute value of speed). A negative value is not interpreted as running reverse. At a minimum, Inp_CommandDir must be handled as stated above.

Required Files

Add-On Instructions are reusable code objects that contain encapsulated logic that can streamline implementing your system. This lets you create your own instruction set for programming logic as a supplement to the instruction set provided natively in the ControlLogix® firmware. An Add-On Instruction is defined once in each controller project, and can be instantiated multiple times in your application code as needed.

Controller File

The P_VSD_3_1-00_AOIL5X Add-On Instruction must be imported into the controller project to be used in the controller configuration. The service release number (boldfaced) can change as service revisions are created.

Visualization Files

The following files for this Add-On Instruction can be downloaded from the Product Compatibility and Download Center at <http://www.rockwellautomation.com/rockwellautomation/support/pcdc.page>.

IMPORTANT Files must be imported in the following order: image files, then global object files, and then graphic files. This order is required to properly configure the visualization files.

Table 5 - P_VSD Visualization File Types

Application Type	File Type	FactoryTalk View SE Software	FactoryTalk View ME Software	Description
Graphics - Displays	GFX	(RA-BAS) P_VSD-Faceplate	(RA-BAS-ME) P_VSD-Faceplate	The faceplate display used for the object.
		(RA-BAS) P_VSD-Help	(RA-BAS-ME) P_VSD-Help	The P_VSD Help faceplate.
		(RA-BAS) P_VSD-Quick	(RA-BAS-ME) P_VSD-Quick	The Quick display for the object.
		(RA-BAS) Common-AnalogEdit	N/A	Faceplate used for analog input data entry. The FactoryTalk View ME faceplates use the native analog input data entry so no file is required.
		(RA-BAS) P_Alarm-Faceplate	(RA-BAS-ME) P_Alarm-Faceplate	The alarm faceplate display used for the object.
		(RA-BAS) P_Alarm-Help	(RA-BAS-ME) P_Alarm-Help	P_Alarm Help information that is accessed from the P_VSD Help faceplate.
		(RA-BAS) P_Mode-Help	(RA-BAS-ME) P_Mode-Help	Mode Help information that is accessed from the P_VSD Help faceplate.
		(RA-BAS) P_Mode-Config	(RA-BAS-ME) P_Mode-Config	Message box used to set Default mode.

Table 5 - P_VSD Visualization File Types

Application Type	File Type	FactoryTalk View SE Software	FactoryTalk View ME Software	Description
Optional Graphic Displays	GFX	(RA-BAS) P_Intlk-Faceplate	(RA-BAS-ME) P_Intlk-Faceplate	The interlock faceplate display used for the object. Use this file if your Variable Speed Drive has an associated P_Intlk object and you enable navigation to its faceplate from the Variable Speed Drive faceplate.
		(RA-BAS) P_IntlkPerm-Help	(RA-BAS-ME) P_IntlkPerm-Help	Interlock/Permissives Help information that is accessed from the P_Intlk or P_Perm Help faceplate. Use this file if you use the Variable Speed Drive Interlock or Permissives faceplate.
		(RA-BAS) P_Perm-Faceplate	(RA-BAS-ME) P_Perm-Faceplate	The permissive faceplate display used for the object. Use this file if your Variable Speed Drive has an associated P_Perm object and you enable navigation to its faceplate from the Variable Speed Drive faceplate.
		(RA-BAS) P_Reslnh-Faceplate	(RA-BAS-ME) P_Reslnh-Faceplate	The Restart Inhibit faceplate display used for the object. Use this file if your Variable Speed Drive has an associated P_Reslnh object and you enable navigation to its faceplate from the Variable Speed Drive faceplate.
		(RA-BAS) P_RunTime-Faceplate	(RA-BAS-ME) P_RunTime-Faceplate	The RunTime faceplate display used for the object. Use this file if your Variable Speed Drive has an associated P_RunTime object and you enable navigation to its faceplate from the Variable Speed Drive faceplate.
Graphics - Global Objects	GGFX	(RA-BAS) P_VSD Graphics Library	(RA-BAS-ME) P_VSD Graphics Library	Common global objects in the graphics library for this instruction.
		(RA-BAS) Common Faceplate Objects	(RA-BAS-ME) Common Faceplate Objects	Common global objects used on all Process Object faceplates.
		(RA-BAS) Process Alarm Objects	(RA-BAS-ME) Process Alarm Objects	Global objects used for managing alarms on Process Object faceplates.
		(RA-BAS) Process Faceplate Motor Objects	(RA-BAS-ME) Process Faceplate Motor Objects	Global objects used for Process Object motor faceplates.
		(RA-BAS) Process Help Objects	(RA-BAS-ME) Process Help Objects	Global objects used for help on Process Objects help displays.
		(RA-BAS) Process Interlock Objects	(RA-BAS-ME) Process Interlock Objects	Global objects used for managing interlocks and permissives on Process Object faceplates.
		(RA-BAS) Process Mode Objects	(RA-BAS-ME) Process Mode Objects	Global objects used for managing modes on Process Object faceplates.
Graphics - Images	PNG	All .png files in the images folder	All .png files in the images folder	These are the common icons used in the global objects and faceplates for all Process Objects. When PNG graphic formats are imported they are renamed like a BMP file but retain a PNG format.
HMI Tags	CSV	N/A	FTVME_PlantPaxLib_Tags_3_1_00.csv ⁽¹⁾	These tags must be imported into the FactoryTalk View ME project to support switching tabs on any Process Object faceplate.

(1) The service release number (boldfaced) can change as service revisions are created.

Controller Code

This section describes the parameter references for this Add-On Instruction.

Variable Speed Drive InOut Structure

InOut parameters are used to link the Add-On Instruction to external tags that contain necessary data for the instruction to operate. These external tags must be of the data type shown.

Table 6 - P_VSD Drive InOut Parameters

Tag Name	Data Type	Description
Ref_FaultCodeList	P_DescList[1]	Array tag containing list of fault codes (DINT) and their descriptions (STRING_40).

This figure shows the drive fault table tags that are in each template.

PF4xx_FaultCodeList	{ ... }	P_DescList[36]	PowerFlex 4 / 40 / 400 Fault Codes and Descriptions
PF525_FaultCodeList	{ ... }	P_DescList[61]	PowerFlex 525 VFD Fault Codes and Descriptions
PF700S_FaultCodeList	{ ... }	P_DescList[80]	PowerFlex 700S VFD Fault Codes and Descriptions
PF75x_FaultCodeList	{ ... }	P_DescList[212]	PowerFlex 753 / 755 Fault Codes and Descriptions
PF7xx_FaultCodeList	{ ... }	P_DescList[120]	PowerFlex 70 / 700 / 700H Fault Codes and Descriptions
PFDC_FaultCodeList	{ ... }	P_DescList[50]	PowerFlex DC Drive Fault Codes and Descriptions

To have fault codes in P_VSD, you must enter the name of the Fault Code List (first column) in the P_VSD Ref_FaultCodeList parameter.

Each fault code list has preset codes and descriptions. You can use one of the fault code lists provided by copying the tag from a template application. You can also create your own by using the provided P_DescList data type.

The screenshot shows the 'Controller Tags - RSL5k_18_Template_PlantPAxLib_3_0_07_bas(controller)' window. The 'Scope' is set to 'RSL5k_18_Tem' and 'Show' is set to 'All Tags'. The table displays the following tags:

Name	Value	Style	Data Type	Description
PF4xx_FaultCodeList	{ ... }		P_DescList[36]	PowerFlex 4 / 40 / 400 Fault Codes and Descriptions
PF525_FaultCodeList	{ ... }		P_DescList[61]	PowerFlex 525 VFD Fault Codes and Descriptions
PF700S_FaultCodeList	{ ... }		P_DescList[80]	PowerFlex 700S VFD Fault Codes and Descriptions
PF75x_FaultCodeList	{ ... }		P_DescList[212]	PowerFlex 753 / 755 Fault Codes and Descriptions
PF7xx_FaultCodeList	{ ... }		P_DescList[120]	PowerFlex 70 / 700 / 700H Fault Codes and Descriptions
PF7xx_FaultCodeList[0]	{ ... }		P_DescList	PowerFlex 70 / 700 / 700H Fault Codes and Descriptions
PF7xx_FaultCodeList[0].Code	0	Decimal	DINT	Code / Description List Entry Code for which to look up
PF7xx_FaultCodeList[0].Desc	'Check drive manual for this fault code'		STRING_40	Code / Description List Entry Description for given Co
PF7xx_FaultCodeList[1]	{ ... }		P_DescList	PowerFlex 70 / 700 / 700H Fault Codes and Descriptions
PF7xx_FaultCodeList[1].Code	1	Decimal	DINT	Code / Description List Entry Code for which to look up
PF7xx_FaultCodeList[1].Desc	'Precharge Active'		STRING_40	Code / Description List Entry Description for given Co
PF7xx_FaultCodeList[2]	{ ... }		P_DescList	PowerFlex 70 / 700 / 700H Fault Codes and Descriptions
PF7xx_FaultCodeList[2].Code	2	Decimal	DINT	Code / Description List Entry Code for which to look up
PF7xx_FaultCodeList[2].Desc	'Auxiliary Input'		STRING_40	Code / Description List Entry Description for given Co
PF7xx_FaultCodeList[3]	{ ... }		P_DescList	PowerFlex 70 / 700 / 700H Fault Codes and Descriptions
PF7xx_FaultCodeList[3].Code	3	Decimal	DINT	Code / Description List Entry Code for which to look up
PF7xx_FaultCodeList[3].Desc	'Power Loss'		STRING_40	Code / Description List Entry Description for given Co

For a complete list of fault codes for a drive, click the Publication number associated with the drive in the table below.

Drive	Publication Number
PowerFlex Digital DC Drive	20P-UM001
PowerFlex 4 Adjustable Frequency AC Drive	22A-UM001
PowerFlex 40 Adjustable Frequency AC Drive	22B-UM001
PowerFlex 400 Adjustable Frequency AC Drive for Fan & Pump Applications	22C-UM001
PowerFlex 40P Adjustable Frequency AC Drive	22D-UM001
PowerFlex 4M Adjustable Frequency AC Drive	22F-UM001
PowerFlex 70 Adjustable Frequency AC Drives	20A-UM001
PowerFlex 700 Adjustable Frequency AC Drive	20B-UM001
PowerFlex 700H Adjustable Frequency AC Drive	20C-PM001
PowerFlex 700S High Performance AC Drive - Phase II Control	20D-PM001

Variable Speed Drive Input Structure

Input parameters include the following:

- Input data elements (Inp_) are typically used to connect field inputs from I/O modules or signals from other objects.
- Configuration data elements (Cfg_) are used to set configurable capabilities and features of the instruction.
- Command data elements (PCmd_, OCmd_, MCmd_) are used by program logic, operators, and maintenance personnel to request instruction actions.
- Setting data elements (PSet_, OSet_, MSet_) are used by program logic, operators, and maintenance personnel to establish runtime setpoints, thresholds, and so forth. Set_ data elements (without a leading P, O, or M) establish runtime settings regardless of role or mode.

Table 7 - P_VSD Input Parameters

Input Parameter	Data Type	Alias For	Default	Description
EnableIn	BOOL		1	Ladder Diagram: If the rung-in condition is true, the instruction's Logic routine executes. If the rung-in condition is false, the instruction's EnableInFalse routine executes. Function Block Diagram: If true, or not connected, the instruction's Logic routine executes. If the parameter is exposed as a pin and wired, and the pin is false, the instruction's EnableInFalse routine executes. Structured Text: No effect. The instruction's Logic routine executes.
Inp_SpeedFdbk	REAL		0.0	Speed feedback in drive units (for example, 0...32,767 = 0 to maximum frequency).
Inp_LastFaultCode	DINT		0	Most recent drive fault code (enumeration).

Table 7 - P_VSD Input Parameters

Input Parameter	Data Type	Alias For	Default	Description
Inp_Datalink	INT		0	Auxiliary signal (datalink) input in drive (raw) units.
Inp_Ready	BOOL		1	1 = Drive is ready to run.
Inp_Running	BOOL		0	1 = Drive is running (active).
Inp_CommandDir	BOOL		1	1 = Drive is commanded forward. 0 = Drive is commanded reverse.
Inp_ActualDir	BOOL		1	1 = Drive is running forward. 0 = Drive is running reverse.
Inp_Accelerating	BOOL		0	1 = Drive is accelerating or decelerating.
Inp_Decelerating				
Inp_Alarm	BOOL		0	1 = Drive has an alarm condition (see drive display or manual).
Inp_Faulted	BOOL		0	1 = Drive has faulted (see drive display or manual).
Inp_AtSpeed	BOOL		0	1 = Drive is at commanded speed.
Inp_FwdPermOK	BOOL		1	1 = Permissives OK, drive can start forward.
Inp_FwdNBPermOK	BOOL		1	1 = Non-bypassable permissives OK, drive can start forward.
Inp_RevPermOK	BOOL		1	1 = Permissives OK, drive can start reverse.
Inp_RevNBPermOK	BOOL		1	1 = Non-bypassable permissives OK, motor can start reverse.
Inp_IntlkOK	BOOL		1	1 = Interlocks OK, drive can start/run.
Inp_NBIntlkOK	BOOL		1	1 = Non-bypassable interlocks OK, drive can start/run.
Inp_IOFault	BOOL		0	Input communication status: 0 = OK 1 = Fail
Inp_Sim	BOOL		0	Simulation input. When set to 1, the instruction keeps outputs de-energized (zero) and simulates a working drive. When set to 0, the instruction operates the drive normally.
Inp_Hand	BOOL	Mode.Inp_Hand	0	1 = Select Hand (hardwired) control strategy.
Inp_Ovrd	BOOL	Mode.Inp_Ovrd	0	1 = Select Override control strategy.
Inp_OvrdCmd	SINT		0	Override mode command: 0 = None 1 = Stop 2 = Start Forward 3 = Start Reverse
Inp_OvrdSpeed	REAL		0.0	Value to set speed reference in Override mode (SpeedRef engineering units).
Inp_OvrdOutDatalink	REAL		0.0	Value to set output datalink in Override mode (OutDatalink engineering units).
Inp_Reset	BOOL		0	Input parameter used to programatically reset alarms and drive faults. When set to 1, all alarms requiring reset are reset and a fault reset signal is sent to the drive.
Cfg_HasReverse	BOOL		0	1 = Drive can be run reverse. 0 = Forward only.
Cfg_HasJog	BOOL		0	1 = Drive Jog command enabled/visible. 0 = Drive Jog command not allowed.
Cfg_AllowLocal	BOOL		0	1 = Allow Local Start/Stop without alarm. 0 = Start/Stop from HMI/Program only.
Cfg_HasRunFdbk	BOOL		1	1 = Drive provides run feedback.
Cfg_UseRunFdbk	BOOL		1	1 = Use drive run feedback for failure checking.
Cfg_HasSpeedFdbk	BOOL		0	1 = Drive provides speed feedback on Inp_SpeedFdbk.

Table 7 - P_VSD Input Parameters

Input Parameter	Data Type	Alias For	Default	Description
Cfg_UseSpeedFdbk	BOOL		0	1 = Use speed feedback > 0 as run feedback.
Cfg_HasInpDatalink	BOOL		0	1 = A signal is connected to Inp_Datalink or Out_Datalink.
Cfg_HasOutDatalink				
Cfg_HasFwdPermObj	BOOL		0	1 = Tells HMI a permissive object (for example, P_Perm) is connected to Inp_FwdPerm or Inp_RevPerm. IMPORTANT: The name of the Permissive object in the controller must be this object's name with the suffix '_FwdPerm' or '_RevPerm'. For example, if your P_VSD object has the name 'Drive123', then its Permissive object must be named 'Drive123_FwdPerm' or 'Drive123_RevPerm'.
Cfg_HasRevPermObj				
Cfg_HasIntlkObj	BOOL		0	1 = Tells HMI an interlock object (for example, P_Intlk) is connected to Inp_Intlk. IMPORTANT: The name of the Interlock object in the controller must be this object's name with the suffix '_Intlk'. For example, if your P_VSD object has the name 'Valve123', then its Interlock object must be named 'Drive123_Intlk'.
Cfg_HasResInhObj	BOOL		0	1 = Tells HMI a restart inhibit (for example, P_ResInh) or runtime (for example, P_RunTime) object is connected. IMPORTANT: The name of the Restart Inhibit object in the controller must be this object's name with the suffix '_ResInh'. For example, if your P_VSD object has the name 'Drive123', then its Restart Inhibit object must be named 'Drive123_ResInh'. IMPORTANT: The name of the Run Time object in the controller must be this object's name with the suffix '_RunTime'. For example, if your P_VSD object has the name 'Drive123', then its Run Time object must be named 'Drive123_RunTime'.
Cfg_HasRunTimeObj				
Cfg_SetTrack	BOOL		1	This parameter is used to set up bumpless behavior of setting parameters when switching modes. When this parameter is 1, in Program mode the operator settings track the program settings; in Operator mode the program settings track the operator settings; and the simulation inputs match the output values (transitions are bumpless). When this parameter is 0, the operator settings and program settings are not modified by this instruction. In this case, when the mode is changed, the effective value of the setting can change depending on the program-set and operator-set values.
Cfg_SetTrackOvrHand	BOOL		0	1 = Program/Operator settings track Override/Hand speed reference.
Cfg_PCmdClear	BOOL	Mode.Cfg_PCmdClear	1	When this parameter is 1, program commands are cleared once they are acted upon. When set to 0, program commands remain set until cleared by the application program logic.
Cfg_ProgDefault	BOOL	Mode.Cfg_ProgDefault	0	This parameter defines the default mode. When this parameter is 1, the mode defaults to Program if no mode is being requested. When this parameter is 0, the mode defaults to Operator if no mode is being requested.
Cfg_OperStopPrio	BOOL		0	1 = OCmd_Stop has priority, accepted any time. 0 = OCmd_Stop only in Operator or Maintenance mode.
Cfg_OCcmdResets	BOOL		0	1 = New Operator drive command resets fault. 0 = Reset required to clear fault.
Cfg_OvrPermIntlk	BOOL		0	1 = Override ignores bypassable permissives/interlock. 0 = Override uses all permissives/interlocks.
Cfg_ShedOnFailToStart	BOOL		1	1 = Stop motor and alarm on Fail to Start. 0 = Alarm only on Fail to Start.
Cfg_ShedOnIOFault	BOOL		1	1 = Stop motor and alarm on I/O fault. 0 = Alarm only on I/O fault.
Cfg_SimScaleEU	BOOL		0	1 = In simulation, scale speed reference engineering units to speed feedback engineering units. 0 = If both Cfg_SimScaleEU and Cfg_SimScaleRaw are 0, then in simulation, the speed reference is copied to the speed feedback without scaling.

Table 7 - P_VSD Input Parameters

Input Parameter	Data Type	Alias For	Default	Description
Cfg_SimScaleRaw	BOOL		0	1 = In simulation, scale speed reference engineering units to raw, then raw to speed feedback Engineering Units 0 = If both Cfg_SimScaleRaw and Cfg_SimScaleEU are 0, then in simulation, the speed reference is copied to the speed feedback without scaling.
Cfg_HasFailToStartAlm	BOOL	FailToStart.Cfg_Exists	0	These parameters determine whether the corresponding alarm exists and is checked or if the alarm does not exist and is not used. When these parameters are 1, the corresponding alarm exists.
Cfg_HasFailToStopAlm		FailToStop.Cfg_Exists		
Cfg_HasIntlkTripAlm		IntlkTrip.Cfg_Exists		
Cfg_HasDriveFaultAlm		DriveFault.Cfg_Exists		
Cfg_HasIOFaultAlm		IOFault.Cfg_Exists		
Cfg_FailToStartResetReqd	BOOL	FailToStart.Cfg_ResetReqd	0	These parameters determine whether a reset is required to clear the alarm status. When these parameters are 1, the alarm is latched ON when the alarm occurs. After the alarm condition returns to normal, a reset is required to clear the alarm status. When these parameters are 0, no reset is required and the alarm status is cleared when the alarm condition returns to normal. IMPORTANT: If the reset clears the alarm, it also acknowledges the alarm.
Cfg_FailToStopResetReqd		FailToStop.Cfg_ResetReqd		
Cfg_IntlkTripResetReqd		IntlkTrip.Cfg_ResetReqd		
Cfg_DriveFaultResetReqd		DriveFault.Cfg_ResetReqd		
Cfg_IOFaultResetReqd		IOFault.Cfg_ResetReqd		
Cfg_FailToStartAckReqd	BOOL	FailToStart.Cfg_AckReqd	1	These parameters determine whether an acknowledgement is required for an alarm. When these parameters are 1, the acknowledge (ack) bit is cleared when the alarm occurs. An acknowledge command (for example, PCmd_FailAck or Fail.OCmd_Ack) is required to acknowledge the alarm. When set to 0, the Acknowledge bit is set when an alarm occurs, indicating an acknowledged alarm and no acknowledge command is required.
Cfg_FailToStopAckReqd		FailToStop.Cfg_AckReqd		
Cfg_IntlkTripAckReqd		IntlkTrip.Cfg_AckReqd		
Cfg_DriveFaultAckReqd		DriveFault.Cfg_AckReqd		
Cfg_IOFaultAckReqd		IOFault.Cfg_AckReqd		
Cfg_FailToStartSeverity	INT	FailToStart.Cfg_Severity	1000	These parameters determine the severity of each alarm. This drives the color and symbol that are used to indicate alarm status on the faceplate and global object. The following are valid values: 1...250 = Low 251...500 = Medium 501...750 = High 751...1000 = Urgent IMPORTANT: For FactoryTalk View software version 7.0, these severity parameters drive only the indication on the global object and faceplate. The Alarms and Events definition of severity drives the color and symbol that is used on the alarm banner and alarm summary as well as the value returned by FactoryTalk Alarms and Events display commands.
Cfg_FailToStopSeverity		FailToStop.Cfg_Severity	1000	
Cfg_IntlkTripSeverity		IntlkTrip.Cfg_Severity	500	
Cfg_DriveFaultSeverity		DriveFault.Cfg_Severity	1000	
Cfg_IOFaultSeverity		IOFault.Cfg_Severity	1000	
Cfg_MinSpdRef	REAL		0.0	Minimum/maximum speed reference in engineering units (for limiting).
Cfg_MaxSpdRef			60.0	
Cfg_SpeedRefRawMin	REAL		0.0	Speed reference minimum/maximum in drive (raw) units (for scaling).
Cfg_SpeedRefRawMax			32,767.0	
Cfg_SpeedRefEUMin	REAL		0.0	Speed reference minimum/maximum in engineering units (for scaling).
Cfg_SpeedRefEUMax			130.0	
Cfg_SpeedFdbkRawMin	REAL		0.0	Speed feedback minimum/maximum in drive (raw) units (for scaling).
Cfg_SpeedFdbkRawMax			32,767.0	
Cfg_SpeedFdbkEUMin	REAL		0.0	Speed feedback minimum/maximum in engineering units (for scaling).
Cfg_SpeedFdbkEUMax			130.0	
Cfg_InpDatalinkRawMin	REAL		0.0	Input datalink minimum/maximum in drive (raw) units (for scaling).
Cfg_InpDatalinkRawMax			4095.0	

Table 7 - P_VSD Input Parameters

Input Parameter	Data Type	Alias For	Default	Description
Cfg_InpDatalinkEUMin	REAL		0.0	Input datalink minimum/maximum in engineering units (for scaling).
Cfg_InpDatalinkEUMax			409.5	
Cfg_OutDatalinkMin	REAL		0.0	Minimum/maximum output datalink in engineering units (for limiting).
Cfg_OutDatalinkMax			100.0	
Cfg_OutDatalinkRawMin	REAL		0.0	Output datalink minimum/maximum in drive (raw) units (for scaling).
Cfg_OutDatalinkRawMax			4095.0	
Cfg_OutDatalinkEUMin	REAL		0.0	Output datalink minimum/maximum in engineering units (for scaling).
Cfg_OutDatalinkEUMax			409.5	
Cfg_SimRampT	DINT		10	Time to ramp speed feedback when in simulation (seconds).
Cfg_FailToStartT	DINT		15	Time after start to get run feedback before fault (seconds).
Cfg_FailToStopT	DINT		15	Time after stop to drop run feedback before fault (seconds).
Cfg_ResetPulseT	DINT		2	Time to pulse Out_Reset to clear drive fault.
Cfg_MaxJogT	REAL		0.0	Maximum jog time (seconds 0 = unlimited).
Cfg_OperKeep	SINT		2#0000_0000	Operator keeps control in Program mode or Program keeps control in Operator mode: .0 = Speed Reference .1 = Start/Stop .2 = Forward/Reverse .3 = Output Datalink
Cfg_ProgKeep				
PSet_SpeedRef	REAL		0.0	Program setting of speed reference (engineering units).
PSet_OutDatalink	REAL		0.0	Program setting of output datalink (engineering units).
PSet_Owner	DINT		0	Program owner request ID (non-zero) or release (zero).
OSet_SpeedRef	REAL		0.0	1 = Operator setting of speed reference (engineering units).
OSet_OutDatalink	REAL		0.0	1 = Operator setting of output datalink (engineering units).
PCmd_Start	BOOL		0	When Cfg_PCmdClear is 1: - Set PCmd_Start to 1 to start the Drive - Set PCmd_Fwd to 1 to run the drive in the forward direction - Set PCmd_Rev to 1 to run the motor in the reverse direction - Set PCmd_Stop to 1 to stop the motor - These parameters are reset automatically When Cfg_PCmdClear is 0: - Set PCmd_Start to 1 to start the drive - Set PCmd_Rev to 0 to run the drive in the forward direction - Set PCmd_Rev to 1 to run the drive in the reverse direction - Set PCmd_Start to 0 to stop the driver - PCmd_Stop and PCmd_Fwd are not used - These parameters do not reset automatically
PCmd_Stop				
PCmd_Fwd	BOOL		0	
PCmd_Rev				
PCmd_Acq	BOOL	Mode.PCmd_Acq	0	When Cfg_PCmdClear is 1: - Set PCmd_Acq to 1 to Acquire - Set PCmd_Rel to 1 to Release - These parameters reset automatically When Cfg_PCmdClear is 0: - Set PCmd_Acq to 1 to Acquire - Set PCmd_Acq to 0 to Release - PCmd_Rel is not used - These parameters do not reset automatically
PCmd_Rel		Mode.PCmd_Rel		

Table 7 - P_VSD Input Parameters

Input Parameter	Data Type	Alias For	Default	Description
PCmd_Lock	BOOL	Mode.PCmd_Lock	0	When Cfg_PCmdClear is 1: - Set PCmd_Lock to 1 to Lock - Set PCmd_Unlock to 1 to Unlock - These parameters reset automatically When Cfg_PCmdClear is 0: - Set PCmd_Lock to 1 to Lock - Set PCmd_Lock to 0 to Unlock - PCmd_Unlock is not used - These parameters do not reset automatically
PCmd_Unlock		Mode.PCmd_Unlock		
PCmd_Reset	BOOL		0	- Set PCmd_Reset to 1 to reset all alarms requiring reset - This parameter is always reset automatically
PCmd_FailToStartAck	BOOL	FailToStart.PCmd_Ack	0	- Set PCmd_<Alarm>Ack to 1 to Acknowledge alarm - The parameter is reset automatically
PCmd_FailToStopAck		FailToStop.PCmd_Ack		
PCmd_IntlkTripAck		IntlkTrip.PCmd_Ack		
PCmd_DriveFaultAck		DriveFault.PCmd_Ack		
PCmd_IOFaultAck		IOFault.PCmd_Ack		
PCmd_FailToStartSuppress	BOOL	FailToStart.PCmd_Suppress	0	When Cfg_PCmdClear is 1: - Set PCmd_<Alarm>Suppress to 1 to suppress alarm - Set PCmd_<Alarm>Unsuppress to 1 to unsuppress alarm - These parameters reset automatically When Cfg_PCmdClear is 0: - Set PCmd_<Alarm>Suppress to 1 to suppress alarm - Set PCmd_<Alarm>Suppress to 0 to unsuppress alarm - PCmd_<Alarm>Unsuppress is not used - These Parameters do not reset automatically
PCmd_FailToStopSuppress		FailToStop.PCmd_Suppress		
PCmd_IntlkTripSuppress		IntlkTrip.PCmd_Suppress		
PCmd_DriveFaultSuppress		DriveFault.PCmd_Suppress		
PCmd_IOFaultSuppress		IOFault.PCmd_Suppress		
PCmd_FailToStartUnsuppress	BOOL	FailToStart.PCmd_Unsuppress	0	
PCmd_FailToStopUnsuppress		FailToStop.PCmd_Unsuppress		
PCmd_IntlkTripUnsuppress		IntlkTrip.PCmd_Unsuppress		
PCmd_DriveFaultUnsuppress		DriveFault.PCmd_Unsuppress		
PCmd_IOFaultUnsuppress		IOFault.PCmd_Unsuppress		
PCmd_FailToStartUnshelve	BOOL	FailToStop.PCmd_Unshelve	0	- Set PCmd_<Alarm>Unshelve to 1 to Unshelve alarm - The parameter is reset automatically
PCmd_FailToStopUnshelve		FailToStart.PCmd_Unshelve		
PCmd_IntlkTripUnshelve		IntlkTrip.PCmd_Unshelve		
PCmd_DriveFaultUnshelve		DriveFault.PCmd_Unshelve		
PCmd_IOFaultUnshelve		IOFault.PCmd_Unshelve		
OCmd_Start	BOOL		0	Operator command to start or stop drive.
OCmd_Stop				
OCmd_Jog	BOOL		0	Operator command to jog drive (not cleared by P_VSD!).
OCmd_Fwd	BOOL		0	Operator command to set direction to forward or reverse.
OCmd_Rev				
OCmd_Bypass	BOOL		0	Operator command to bypass all bypassable interlocks and permissives.
OCmd_Check	BOOL		0	Operator command to check (not bypass) all interlocks and permissives.
MCmd_Disable	BOOL		0	Maintenance command to disable drive.
MCmd_Enable	BOOL		0	Maintenance command to enable drive.
MCmd_Acq	BOOL	Mode.MCmd_Acq	0	Maintenance command to acquire ownership (Operator/Program/Override to Maintenance).

Table 7 - P_VSD Input Parameters

Input Parameter	Data Type	Alias For	Default	Description
MCmd_Rel	BOOL	Mode.MCmd_Rel	0	Maintenance command to release ownership (Maintenance to Operator/Program/Override).
OCmd_AcqLock	BOOL	Mode.OCmd_AcqLock	0	Operator command to acquire and lock mode in Operator mode.
OCmd_Unlock	BOOL	Mode.OCmd_UnlockRel	0	Operator command to unlock and release Operator mode.
OCmd_Reset	BOOL		0	Operator command to reset all alarms requiring reset.
OCmd_ResetAckAll	BOOL		0	Operator command to reset and acknowledge all alarms and reset latched Shed conditions.

Variable Speed Drive Output Structure

Output parameters include the following:

- Output data elements (Out_) are the primary outputs of the instruction, typically used by hardware output modules; however, they can be used by other application logic.
- Value data elements (Val_) are numeric outputs of the instruction for use by the HMI. Values can also be used by other application logic or software packages.
- Source and Quality data elements (SrcQ_) are outputs of the instruction used by the HMI to indicate PV source and quality.
- Status data elements (Sts_) are bit outputs of the instruction for use by the HMI. Status bits can also be used by other application logic.
- Error data elements (Err_) are outputs of the instruction that indicate a particular configuration error. If any Err_ bit is set, then the Sts_Err configuration error summary status is set and the Invalid Configuration indicator is displayed on the HMI.
- Not Ready data elements (Nrdy_) are bit outputs of the instruction for use by the HMI for displaying the Device Not Ready indicator. These bits can also be used by other application logic.
- Alarm data elements (Alm_) are outputs of the instruction that indicate a particular alarm has occurred.
- Acknowledge data elements (Ack_) are outputs of the instruction that indicate the corresponding alarm has been acknowledged.
- Ready data elements (Rdy_) are bit outputs of the instruction used by the HMI to enable or disable Command buttons and entry fields.

Table 8 - P_VSD Output Parameters

Output Parameter	Data Type	Alias For	Description
EnableOut	BOOL		Enable Output: The EnableOut signal is not manipulated by this instruction. Its output state always reflects EnableIn input state.
Out_SpeedRef	REAL		Drive Speed Reference in drive units (for example, 0.0...32,767.0 = 0 to maximum frequency).
Out_Datalink	REAL		Auxiliary signal (datalink) output in drive (raw) units.
Out_Run	BOOL		1 = Start/Run drive. 0 = Stop drive (for held starter type).

Table 8 - P_VSD Output Parameters

Output Parameter	Data Type	Alias For	Description
Out_Stop	BOOL		1 = Stop or start drive. 0 = Drive left in current state.
Out_Start			
Out_Jog	BOOL		1 = Jog drive at jog speed. 0 = Stop jogging.
Out_ClearFault	BOOL		1 = Attempt to clear drive fault.
Out_Fwd	BOOL		1 = Set drive direction to forward or reverse.
Out_Rev			
Val_SpeedRef	REAL		Speed reference (target) to drive. (engineering units)
Val_SpeedFdbk	REAL		Speed feedback (actual) from drive. (engineering units)
Val_InpDatalink	REAL		Input datalink value from drive. (engineering units)
Val_OutDatalink	REAL		Output datalink value to drive. (engineering units)
Val_SpeedRefEUMin	REAL		Minimum of speed reference = Min (Cfg_SpeedFdbkEUMin, Cfg_SpeedFdbkEUMax).
Val_SpeedRefEUMax	REAL		Maximum of speed reference = Max (Cfg_SpeedFdbkEUMin, Cfg_SpeedFdbkEUMax).
Val_SpeedFdbkEUMin	REAL		Minimum of speed feedback = Min (Cfg_SpeedFdbkEUMin, Cfg_SpeedFdbkEUMax).
Val_SpeedFdbkEUMax	REAL		Maximum of speed feedback = Max (Cfg_SpeedFdbkEUMin, Cfg_SpeedFdbkEUMax).
Val_LastFaultCode	DINT		Most recent drive fault code (enumeration).
SrcQ_IO	SINT		I/O signal source and quality.
SrcQ			Final drive status source and quality: GOOD 0 = I/O live and confirmed good quality 1 = I/O live and assumed good quality 2 = No feedback configured, assumed good quality TEST 8 = Device simulated 9 = Device loopback simulation 10 = Manually entered value UNCERTAIN 16 = Live input, off-specification 17 = Value substituted at device/bus 18 = Value substituted by maintenance (Has and not Use) 19 = Shed, using last good value 20 = Shed, using replacement value BAD 32 = Signal failure (out-of-range, NaN, invalid combination) 33 = I/O channel fault 34 = I/O module fault 35 = Bad I/O configuration (for example, scaling parameters)
Val_Cmd	SINT		Device command: 0 = None 1 = Stop 2 = Start Forward 3 = Start Reverse 4 = Jog Forward 5 = Jog Reverse
Val_Fdbk	SINT		Device feedback: 0 = Stopped 1 = Running Forward 2 = Running Reverse 3 = Accelerating 4 = Decelerating

Table 8 - P_VSD Output Parameters

Output Parameter	Data Type	Alias For	Description
Val_Sts	SINT		Device confirmed status: 0 = None 1 = Stopped 2 = Run Forward 3 = Run Reverse 4 = Jog Forward 5 = Jog Reverse 6 = Stopping 7 = Starting Forward 8 = Starting Reverse 33 = Disabled
Val_Fault	SINT		Device fault status: 0 = None 16 = Fail to Start 17 = Fail to Stop 18 = Drive fault 32 = I/O fault 34 = Configuration error
Val_Mode	SINT	Mode.Val	Current P_VSD Instruction mode: 0 = No mode 1 = Hand 2 = Maintenance 3 = Override 4 = Program (locked) 5 = Operator (locked) 6 = Program (unlocked, Operator is default) 7 = Operator (unlocked, Program is default) 8 = Program (unlocked, Program is default) 9 = Operator (unlocked, Operator is default)
Val_Owner	DINT		Current Object Owner ID (0 = not owned).
Val_Notify	SINT		Current alarm level and acknowledgement (enumeration): 0 = No alarm 1 = Alarm cleared: a reset or acknowledge is required 2 = Low (acknowledged) 3 = Low (unacknowledged) 4 = Medium (acknowledged) 5 = Medium (unacknowledged) 6 = High (acknowledged) 7 = High (unacknowledged) 8 = Urgent (acknowledged) 9 = Urgent (unacknowledged)
Sts_Stopped	BOOL		1 = Drive requested to stop and is confirmed stopped.
Sts_Starting	BOOL		1 = Drive requested to run and awaiting run feedback.
Sts_Running	BOOL		1 = Drive requested to run and is confirmed running.
Sts_Stopping	BOOL		1 = Drive requested to stop and awaiting stopped feedback.
Sts_Jogging	BOOL		1 = Drive requested to jog.
Sts_CommandDir	BOOL		1 = Drive commanded to forward. 0 = Reverse.
Sts_ActualDir	BOOL		1 = Drive actual direction is forward. 0 = Reverse.

Table 8 - P_VSD Output Parameters

Output Parameter	Data Type	Alias For	Description
Sts_Accel	BOOL		1 = Drive is accelerating or decelerating.
Sts_Decel			
Sts_NotReady	BOOL		1 = Drive is not ready (cannot be started), check alarms, stops, faults.
Sts_Alarm	BOOL		1 = Drive has an alarm (see drive display or manual).
Sts_AtSpeed	BOOL		1 = Drive is running at reference speed.
Sts_SpeedLimited	BOOL		1 = Speed reference setting exceeds configured maximum/minimum limit.
Sts_Available	BOOL		1 = Drive available for control by automation (Program).
Sts_Bypass	BOOL		1 = Bypassable Interlocks and Permissives are bypassed.
Sts_BypActive	BOOL		1 = Bypassing active (bypassed or maintenance).
Sts_Disabled	BOOL		1 = Drive is disabled.
Sts_NotRdy	BOOL		1 = Motor is not ready to run (independent of mode).
Nrdy_Disabled	BOOL		1 = Device Not Ready: • Device disabled by Maintenance • Configuration Error • Interlock not OK • Permissive not OK • Operator State 0 priority command requires reset • Device Failure (shed requires reset) • I/O Fault (shed requires reset) • Device tripped (Drive Fault) • Drive not ready • Device Logic disabled/no mode
Nrdy_CfgErr			
Nrdy_Intlk			
Nrdy_Perm			
Nrdy_OperPrio			
Nrdy_Fail			
Nrdy_IOFault			
Nrdy_Trip			
Nrdy_DriveNR			
Nrdy_NoMode			
Sts_MaintByp	BOOL		1 = A Maintenance bypass is active, display icon.
Sts_Almlnh	BOOL		1 = An alarm is shelved, disabled or suppressed, display icon.
Sts_Err	BOOL		1 = Error in configuration: see detail bits for reason.
Err_Timer	BOOL		1 = Error in configuration: invalid check or reset pulse time (use 0...2,147,483).
Err_Sim	BOOL		1 = Error in configuration: simulation timer preset: use 0...2,147,483).
Err_Alarm	BOOL		1 = Error in configuration: alarm minimum on time or severity.
Err_FdbkRaw	BOOL		1 = Error in configuration: speed feedback raw minimum = maximum.
Err_FdbkEU	BOOL		1 = Error in configuration: speed feedback engineering units minimum = maximum.
Err_RefLim	BOOL		1 = Error in configuration: speed reference clamping limit minimum > maximum.
Err_RefEU	BOOL		1 = Error in configuration: speed reference engineering units minimum = maximum.
Err_RefRaw	BOOL		1 = Error in configuration: speed reference raw minimum = maximum.
Err_InpDLRaw	BOOL		1 = Error in configuration: input datalink raw minimum = maximum.
Err_InpDLEU	BOOL		1 = Error in configuration: input datalink engineering units minimum = maximum.
Err_OutDLLim	BOOL		1 = Error in configuration: output datalink clamping limits minimum > maximum.
Err_OutDLEU	BOOL		1 = Error in configuration: output datalink engineering units minimum = maximum.
Err_OutDLRaw	BOOL		1 = Error in configuration: output datalink raw minimum = maximum.

Table 8 - P_VSD Output Parameters

Output Parameter	Data Type	Alias For	Description
Sts_Hand	BOOL	Mode.Sts_Hand	1 = Mode is Hand (supersedes Maintenance, Override, Program, Operator), Maintenance (supersedes Override, Program, Operator), Override (supersedes Program, Operator), Program (auto), Operator (manual).
Sts_Maint		Mode.Sts_Maint	
Sts_Ovrd		Mode.Sts_Ovrd	
Sts_Prog		Mode.Sts_Prog	
Sts_Oper		Mode.Sts_Oper	
Sts_ProgOperLock	BOOL	Mode.Sts_ProgOperLock	1 = Program or Operator has requested mode lock.
Sts_NoMode	BOOL	Mode.Sts_NoMode	1 = No mode (disabled because EnableIn is false).
Sts_MACqRcvd	BOOL	Mode.Sts_MACqRcvd	1 = Maintenance Acquire command received this scan.
Sts_FailToStart	BOOL	FailToStart.Inp	1 = Drive failed to start.
Sts_FailToStop		FailToStop.Inp	1 = Drive failed to stop.
Sts_IntlkTrip		IntlkTrip.Inp	1 = Drive was stopped by an Interlock Not OK.
Sts_DriveFault		DriveFault.Inp	1 = Drive fault (see drive display or manual).
Sts_IOFault		IOFault.Inp	I/O communication fault status: 0 = OK 1 = Bad
Alm_FailToStart	BOOL	FailToStart.Alm	1 = Alarm (drive Fail to Start, drive Fail to Stop, drive stopped by an Interlock Not OK, drive fault (see drive display or manual), I/O Fault.
Alm_FailToStop		FailToStop.Alm	
Alm_IntlkTrip		IntlkTrip.Alm	
Alm_DriveFault		DriveFault.Alm	
Alm_IOFault		IOFault.Alm	
Ack_FailToStart	BOOL	FailToStart.Ack	1 = Fail to Start, fail to Stop, Interlock Trip, Drive fault, or I/O Fault alarm has been acknowledged.
Ack_FailToStop		FailToStop.Ack	
Ack_IntlkTrip		IntlkTrip.Ack	
Ack_DriveFault		DriveFault.Ack	
Ack_IOFault		IOFault.Ack	
Sts_FailToStartDisabled	BOOL	FailToStart.Disabled	1 = Fail to Start, Interlock Trip, Drive fault, or I/O Fault alarm has been disabled by maintenance.
Sts_FailToStopDisabled		FailToStop.Disabled	
Sts_IntlkTripDisabled		IntlkTrip.Disabled	
Sts_DriveFaultDisabled		DriveFault.Disabled	
Sts_IOFaultDisabled		IOFault.Disabled	
Sts_FailToStartShelved	BOOL	FailToStart.Shelved	1 = Fail to Start, Interlock Trip, Drive fault, or I/O Fault alarm has been shelved by operator.
Sts_FailToStopShelved		FailToStop.Shelved	
Sts_IntlkTripShelved		IntlkTrip.Shelved	
Sts_DriveFaultShelved		DriveFault.Shelved	
Sts_IOFaultShelved		IOFault.Shelved	
Sts_FailToStartSuppressed	BOOL	FailToStart.Suppressed	1 = Fail to Start, Interlock Trip, Drive fault, or I/O Fault alarm has been suppressed by program.
Sts_FailToStopSuppressed		FailToStop.Suppressed	
Sts_IntlkTripSuppressed		IntlkTrip.Suppressed	
Sts_DriveFaultSuppressed		DriveFault.Suppressed	
Sts_IOFaultSuppressed		IOFault.Suppressed	

Table 8 - P_VSD Output Parameters

Output Parameter	Data Type	Alias For	Description
Rdy_Start	BOOL		1 = Ready to receive OCmd (Start, Stop, Jog, Fwd, rev, Bypass, Check, or Reset) (enables HMI button).
Rdy_Stop			
Rdy_Jog			
Rdy_Fwd			
Rdy_Rev			
Rdy_Bypass			
Rdy_Check			
Rdy_Reset			
Rdy_Disable	BOOL		1 = Ready to receive MCmd (Disable or Enable) (enables HMI button).
Rdy_Enable			
Rdy_ResetAckAll	BOOL		1 = At least one alarm or latched shed condition requires reset or acknowledgement.
Rdy_SpeedRef	BOOL		1 = Ready to receive OSet_SpeedRef (enables data entry field).
Rdy_OSet	BOOL		1 = Ready to receive OSets (other than Speed Reference) (enables data entry fields).
P_VSD	BOOL		Unique parameter name for auto-discovery.

Variable Speed Drive Local Configuration Tags

Configuration parameters that are arrayed, string, or structure data types cannot be configured as parameters for Add-On Instructions. Configuration parameters of these types appear as local tags to the Add-On Instruction. Local tags can be configured through the HMI faceplates or in RSLogix™ 5000 software by opening the Instruction Logic of the Add-On Instruction instance and then opening the Data Monitor on a local tag. These parameters cannot be modified by using controller logic or RSLogix 5000 software export/import functionality.

Table 9 - P_VSD Local Configuration Tags

Tag Name	Data Type	Default	Description
Cfg_Desc	STRING_40	'Variable Speed Drive'	Description for display on HMI. This string is shown in the title bar of the faceplate.
Cfg_FwdText	STRING_16	'Forward'	Name for Forward Direction, for example, 'Up', 'Forward'.
Cfg_InpDatalinkEU	STRING_8	''	Datalink Input Engineering Units for display on HMI.
Cfg_InpDatalinkLabel	STRING_20	''	Datalink Input Label displayed on faceplate.
Cfg_Label	STRING_20	'Motor Speed Control'	Label for graphic symbol displayed on HMI. This string appears on the graphic symbol.
Cfg_OutDatalinkEU	STRING_8	''	Datalink Output Engineering Units for display on HMI.
Cfg_OutDatalinkLabel	STRING_20	''	Datalink Output Label displayed on faceplate.
Cfg_RevText	STRING_16	'Reverse'	Name for Reverse Direction, for example, 'Down', 'Reverse'.
Cfg_SpeedFdbkEU	STRING_8	'Hz'	Speed Feedback Engineering Units for display on HMI.
Cfg_SpeedRefEU	STRING_8	'Hz'	Speed Reference Engineering Units for display on HMI.
Cfg_Tag	STRING_20	'P_VSD'	Tagname for display on HMI. This string is shown in the title bar of the faceplate.

Operations

This section describes the primary operations for Add-On Instructions.

Modes

The P_VSD Add-On Instruction uses the following standard modes implemented by using an embedded P_Mode Add-On Instruction.

Mode	Description
Operator	Control of the device is owned by the Operator. Operator Commands (OCmd_) and Operator Settings (OSet_) from the HMI are accepted.
Program	Control of the device is owned by Program logic. Program Commands (PCmd_) and Program Settings (PSet_) are accepted.
Override	Control of the device is owned by priority logic, superseding Operator and Program control. Override Inputs (Inp_OvrCmd and other Inp_OvrDxxx values) are accepted. If so configured, bypassable interlocks and permissives are bypassed.
Maintenance	Control of the device is owned by Maintenance. Operator Commands and Settings from the HMI are accepted. Bypassable interlocks and permissives are bypassed, and device timeout checks are not processed.
Hand	Control of the device is owned by hardwired logic or other logic outside the instruction. The instruction tracks the state of the device for bumpless transfer back to one of the other modes.
No Mode	The device is disabled and has no owner because the EnableIn input is false. The main instruction Logic routine is not being scanned. See Execution for more information on EnableInFalse processing.

Some drive capabilities can be kept by (reserved for) the operator or program logic, independent of the Program or Operator mode selection.

Refer to the Rockwell Automation Library of Process Objects: Common Mode Block (P_Mode) Reference Manual, publication [SYSLIB-RM005](#), for more information.

Alarms

The P_VSD instruction uses the following alarms, implemented by using embedded P_Alarm Add-On Instructions.

Alarm	P_Alarm Name	Description
Fail to Start	FailToStart	Raised if the drive has and is using run feedback, an attempt is made to start the drive, and the run feedback does not indicate the drive running within the configured time.
Fail to Stop	FailToStop	Raised if the drive has and is using run feedback, an attempt is made to stop the drive, and the run feedback does not indicate the drive stopped within the configured time.
Interlock Trip	IntLkTrip	Raised if the drive is running and an Interlock causes it to stop. If Interlocks are not bypassed, a Non-Bypassable Interlock Not OK or a Bypassable Interlock Not OK stops the drive. If Interlocks are bypassed, only a Non-Bypassable Interlock Not OK stops the drive.
Drive Fault	DriveFault	Raised if the Inp_Faulted input is true. Enables display of the drive fault code and fault text.
I/O Fault	IOFault	Raised if the Inp_IOFault input is true.

The fail to start and fail to stop status and alarms have a configurable delay to allow the run feedback time to align with the commanded output (time for the drive to actually start or stop).

The fail to start and I/O fault conditions can be configured to alarm only, or to de-energize the motor (shed). If one of these conditions stops the motor, a reset is required to run.

Refer to the Rockwell Automation Library of Objects: Common Alarm Block (P_Alarm) Reference Manual, publication [SYSLIB-RM002](#), for more information.

Simulation

Simulation in P_VSD simulates a working drive while the outputs to the drive are kept de-energized. The object can be manipulated as if a working drive were present. This includes a basic ramp-up of speed feedback value on starting and ramp-down on stopping. The simulated ramp-up-to-speed time is configurable. This capability is used often for activities such as system testing and operator training.

You must set the Inp_Sim parameter in the controller to '1' to enable simulation.

The Loopback Test icon  is displayed at the bottom left of the Operator faceplate, indicating the device is in simulation.

You are also able to set the following parameters in the controller:

- Cfg_SimRampT - Time to ramp speed feedback in seconds.
- Cfg_SimScaleEU - When this parameter is set to '1', Speed Reference engineering units are scaled to Speed Feedback engineering units.
- Cfg_SimScaleRaw - When this parameter is set to '1', Speed Reference engineering units are scaled to raw, then raw to Speed Feedback engineering units.

When you have finished in simulation, set the Inp_Sim parameter in the controller to '0' to start, stop, and monitor the actual drive.

Execution

The following table explains the handling of instruction execution conditions.

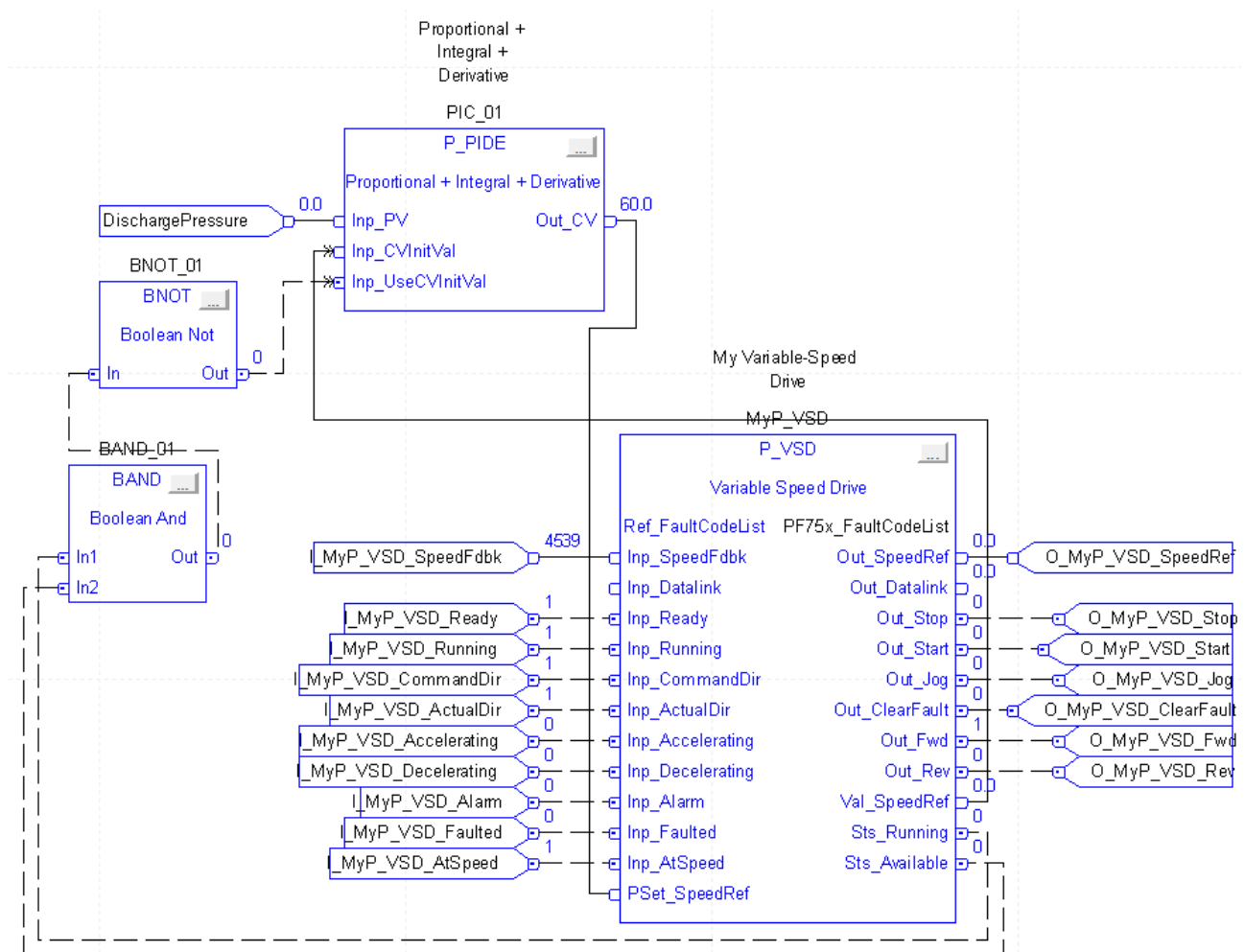
Condition	Description
EnableIn False (false rung)	Processing for EnableIn False (false rung) is handled the same as if the drive were disabled by command. The drive outputs are de-energized and the drive is shown as disabled on the HMI.
Powerup (prescan, first scan)	Processing of modes and alarms on prescan and powerup is handled by the embedded P_Mode and P_Alarm Add-On Instructions - refer to their specifications for details. On powerup, the drive is treated as if it had been commanded to stop.
Postscan (SFC transition)	No SFC postscan logic is provided.

Refer to the Logix5000™ Controllers Add-On Instructions Programming Manual, publication [1756-PM010](#), for more information.

Programming Example

An example showing P_VSD with P_PIDE is shown below.

The output of the P_PIDE block (Out_CV) is used as the input to the P_VSD block (PSet_SpeedRef). The P_VSD output Sts_Available is True when the drive is available to be controlled by the program. Sts_Running is True when the drive is running. When either of these values are False (the drive is not in program mode, or the drive is not running, or both), the P_PIDE input Inp_UseCVInitVal is set to True, forcing the P_PIDE block to initialize its CV value to Inp_CVInitVal. Inp_CVInitVal is wired from the output Val_SpeedRef (speed target to the drive).



Display Elements

A display element (global object) is created once and can be referenced multiple times on multiple displays in an application. When changes are made to the original (base) object, the instantiated copies (reference objects) are automatically updated. Use of global objects, in conjunction with tag structures in the ControlLogix system, aid consistency and save engineering time.

Table 10 - P_VSD Display Elements Description

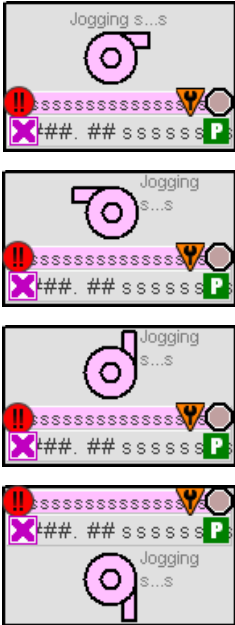
Display Element Name	Display Element	Description
GO_P_VSD_R GO_P_VSD_U GO_P_VSD_D		Motors operate in different positions: right, up, and down.
GO_P_VSD_Blower_R GO_P_VSD_Blower_L GO_P_VSD_Blower_U GO_P_VSD_Blower_D		Blowers operate in different positions: right, left, up, and down.
GO_P_VSD_Conveyer_R		Conveyor shown as a display element.

Table 10 - P_VSD Display Elements Description

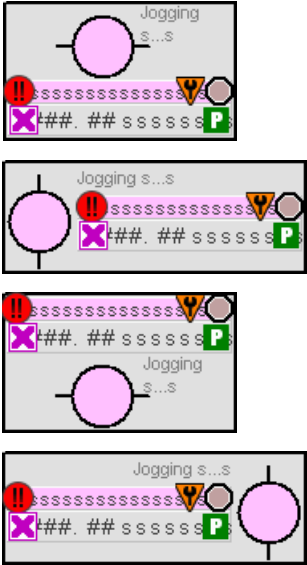
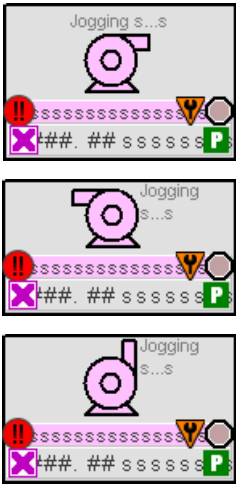
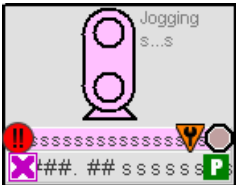
Display Element Name	Display Element	Description
GO_P_VSD_Inline_U GO_P_VSD_Inline_R GO_P_VSD_Inline_L GO_P_VSD_Inline_D		Inline Motors operate in several positions: up, right, left, and down.
GO_P_VSD_Pump_R GO_P_VSD_Pump_L GO_P_VSD_Pump_U		Pumps operate in several positions: right, left, and up.
GO_P_VSD_Agitator_D		Agitator shown as a display element.
GO_P_VSD_Mixer_U		Mixer shown as a display element.
GO_P_VSD_RPump_U		Rotary Gear Pump shown as a display element.

Table 10 - P_VSD Display Elements Description

Display Element Name	Display Element	Description
GO_P_VSD_Fan_D		Fan shown as a display element.

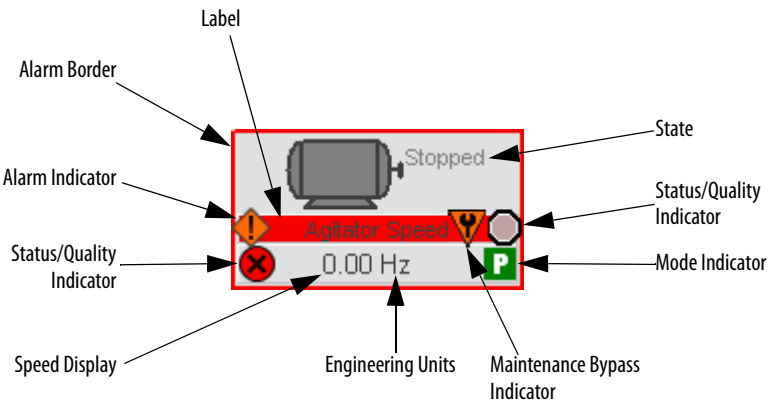
Graphic symbols provide end-users with the following:

- Information on the motor’s current state
- Touch field to open the object’s faceplate
- Tooltip to display the object’s configured tag and description

Common attributes of the P_VSD instruction graphic symbols include the following:

- Graphical representation of the driven equipment
- Speed of the motor with engineering units
- Present state of the motor in text
- Various status/quality indicators
- Mode indicator
- Direction indicator (if the drive is configured as reversing)
- Label
- Alarm Indicator
- Alarm border and label background that changes color for the severity of the alarm
- Maintenance bypass indicator

Drive graphic symbols have the following common attributes.



State Indicators



State Indicator text changes and the graphic symbol color changes depending on the state of the drive.

Table 11 - Drive State Colors

Color	State
Blue	Stopping
Dark Gray	Stopped
Light Blue	Jogging
Blue	Starting
White	Running

Status/Quality Indicators

One of these symbols appears on graphic symbol when the described condition is true.

Graphic Symbol	Description
	Invalid configuration.
	I/O fault (status is stale).
	I/O communication uncertain.
	The device is not ready to operate.
	The device has been disabled.
	The device is accelerating.
	The device is decelerating.
	The device is at st target speed.
	Speed reference limited to min/max.
No symbol displayed	I/O quality good and configuration valid.

TIP When the Invalid Configuration indicator appears, you can find what configuration setting is invalid by following the indicators. Click the graphic symbol to open the faceplate. The Invalid Configuration indicator appears next to the appropriate tab at the top of the faceplate to guide you in finding the configuration error. Once you navigate to the tab, the misconfigured item is flagged with this indicator or appear in a magenta box.

For the P_VSD instruction, the invalid configuration indicator appears under the following conditions:

- The Fail to Start check time, Fail to Stop check time, or Fault Reset output pulse time is set to a value less than zero or greater than 2,147,483 seconds.
- The feedback simulation time is set to a value less than zero or greater than 2,147,483 seconds.
- The configured scaled minimum and scaled maximum have the same value, or the raw minimum and raw maximum have the same value, for the Speed Reference scaling, Speed Feedback scaling, Input Datalink scaling (if used), or Output Datalink scaling (if used).
- The configured Output Datalink maximum clamp value is less than the minimum Output Datalink clamp value (if used).
- The configured maximum Speed Reference clamp value is less than the minimum Speed Reference clamp value.
- The configured Minimum Speed Reference clamp value is less than zero.
- Alarm Severity is set to a value less than 1 or greater than 1000.

TIP When the Not Ready indicator appears, you can find what condition is preventing operation by following the indicators. Click the graphic symbol to open the faceplate. The Not Ready indicator appears next to the appropriate tab at the top of the faceplate to guide you in finding the condition. When you navigate to the tab, the condition preventing operation is flagged.

For the Variable Speed Drive instruction, the Device Not Ready indicator appears under the following conditions:

- Device has been disabled by Maintenance.
- There is a configuration error.
- Interlock or Permissive is not OK.
- Operator State 0 priority command requires reset.
- Device Failure and shed requires reset.
- I/O Fault.
- I/O Fault has cleared, but its shed latch needs to be reset.
- Device has tripped (Drive Fault).
- Drive not ready
- Device logic is disabled or there is no mode.

Maintenance Bypass Indicator

This symbol appears to the right of the label to indicate that a Maintenance bypass has been activated.

Graphic Symbol	Description
	A Maintenance bypass is active.
No symbol displayed	No Maintenance bypass active.

TIP When the Maintenance Bypass Indicator appears, you can find what condition was bypassed by following the indicators. Click the Graphic Symbol to open the Faceplate. The Maintenance Bypass Indicator appears next to the appropriate tab at the top of the Faceplate to guide you in finding the bypass. Once you navigate to the tab, the bypassed item is flagged with this indicator.

For the P_VSD instruction, the Maintenance Bypass indicator appears under the following condition:

- Bypassable interlocks and permissives have been bypassed.
- The motor is configured to have run feedbacks (on the Engineering tab of the faceplate), but the run feedbacks are not being used (selection on the Maintenance tab of the faceplate).

Mode Indicators

One of these symbols appears to the right of the graphic symbol to indicate the mode of the motor instruction.

Table 12 - Mode Indicators

Graphic Symbol	Description
Transparent	Operator Mode (if the default mode is Operator and in Operator mode, the mode indicator is transparent)
	The motor is in Operator mode.
	The motor is in Operator mode and the program cannot acquire.
Transparent	Program Mode (if the default mode is Program and in Program mode, the mode indicator is transparent)
	The motor is in Program mode.
	The motor is in Program mode and the operator cannot acquire.
	The motor is in Override mode.

Table 12 - Mode Indicators

Graphic Symbol	Description
	The motor is in Maintenance mode.
	The motor is in Hand (local) mode.
	No mode: the instruction is scanned false and is out of service, the outputs are held off, and alarms are not updated.

Refer to the Rockwell Automation Library of Process Objects: Common Mode Block (P_Mode) Reference Manual, publication [SYSLIB-RM005](#), for more information.

Alarm Indicators

One of these symbols appears to the left of the label to indicate the described alarm condition. The alarm border and label background blink if acknowledgement of an alarm condition is required.

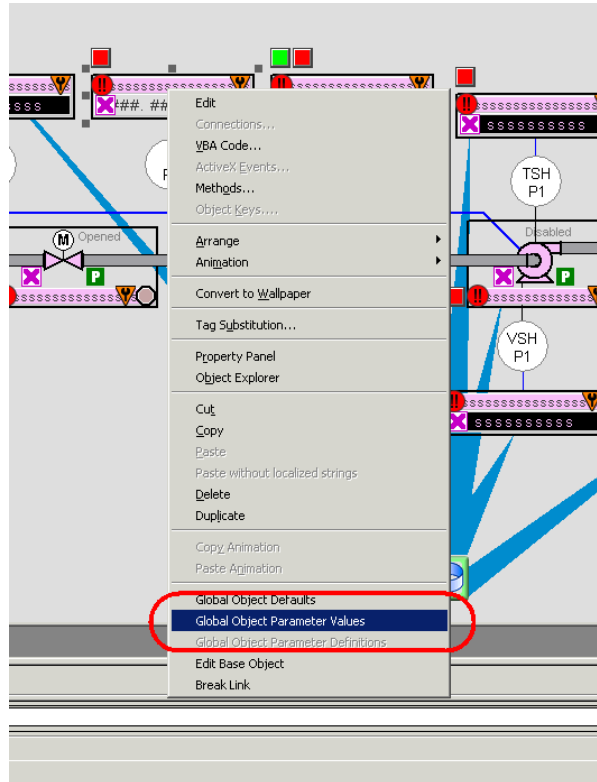
Symbol	Border and Label Background	Description
	No change in color	Alarm Inhibit: an alarm is suppressed by the Program, disabled by Maintenance, or shelved by the Operator.
	White	Return to normal (no alarm condition), but a previous alarm has not been acknowledged.
	Blue	Low severity alarm.
	Yellow	Medium severity alarm.
	Red	High severity alarm.
	Magenta	Urgent severity alarm.
No symbol	No change in color	No alarm or alarm inhibit condition, and all alarms are acknowledged.

Refer to the Rockwell Automation Library of Process Objects: Common Alarm Block (P_Alarm) Reference Manual, publication [SYSLIB-RM002](#), for more information.

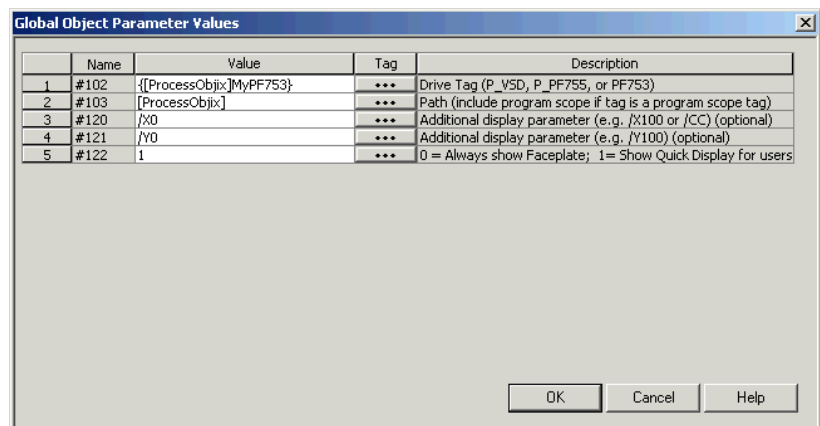
Using Display Elements

The graphic symbol for P_VSD can be found in the global object file (RA-BAS) P_VSD Graphics Library.ggfx.

1. Copy the global object from the global object file and paste it in the display file.
2. In the display, right-click the global object and choose Global Object Parameter Values.



The Global Object Parameter Values dialog box appears.



The global object parameters are as follows.

Parameter	Required	Description
#102	Y	Object tag to point to the name of the associated object Add-On Instruction in the controller.
#103	Y	Path used for display navigation features to other objects. Include program scope if tag is a program scope tag.
#120	N	Additional parameter to pass to the display command to open the faceplate. Typically used to define position for the faceplate.
#121	N	Additional parameter to pass to the display command to open the faceplate. if defining X and Y coordinate, separate parameters so that X is defined by #120 and Y is defined by #121. This lets the same parameters be used in subsequent display commands originating from the faceplate.
#122	Y	These are the options for the global object display: 0 = Always show faceplate 1 = Show Quick Display for users without Maintenance access (Code C) 2 = Always show Quick Display

3. Type the tag or value in the Value column as specified in the Description column.

TIP

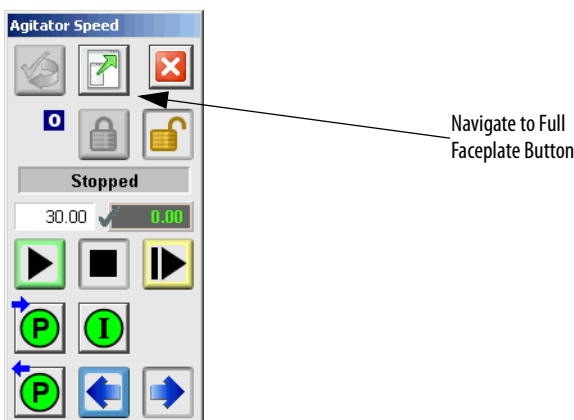
Click the ellipsis (. . .) to browse and choose a tag.

Values for items marked '(optional)' can be left blank.

4. Click OK.

Quick Display

The Quick Display screen provides the means for operators to perform simple interactions with the P_VSD instruction instance. From the Quick Display, you can navigate to the faceplate for full access for operation, maintenance, and configuration.



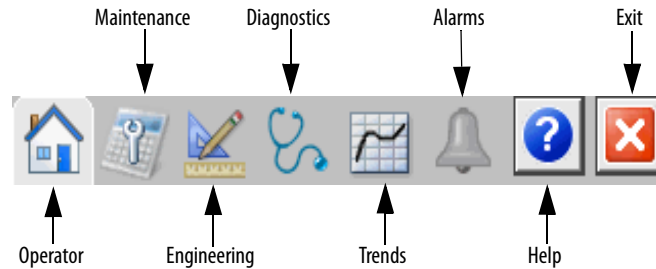
Faceplate

The P_VSD faceplate consists of six tabs and each tab consists of one or more pages.

The title bar of each faceplate contains the value of local configuration tags Cfg_Tag and Cfg_Desc.

Tag - Description

The Operator tab is displayed when the faceplate is initially opened. Click the appropriate icon at the top of the screen to access a specific tab.



The faceplate provides the means for operators, maintenance personnel, engineers, and others to interact with the P_VSD instruction instance, including viewing its status and values and manipulating it through its commands and settings. When a given input is restricted via FactoryTalk View software security, the required user Security Code letter is shown in the tables that follow.

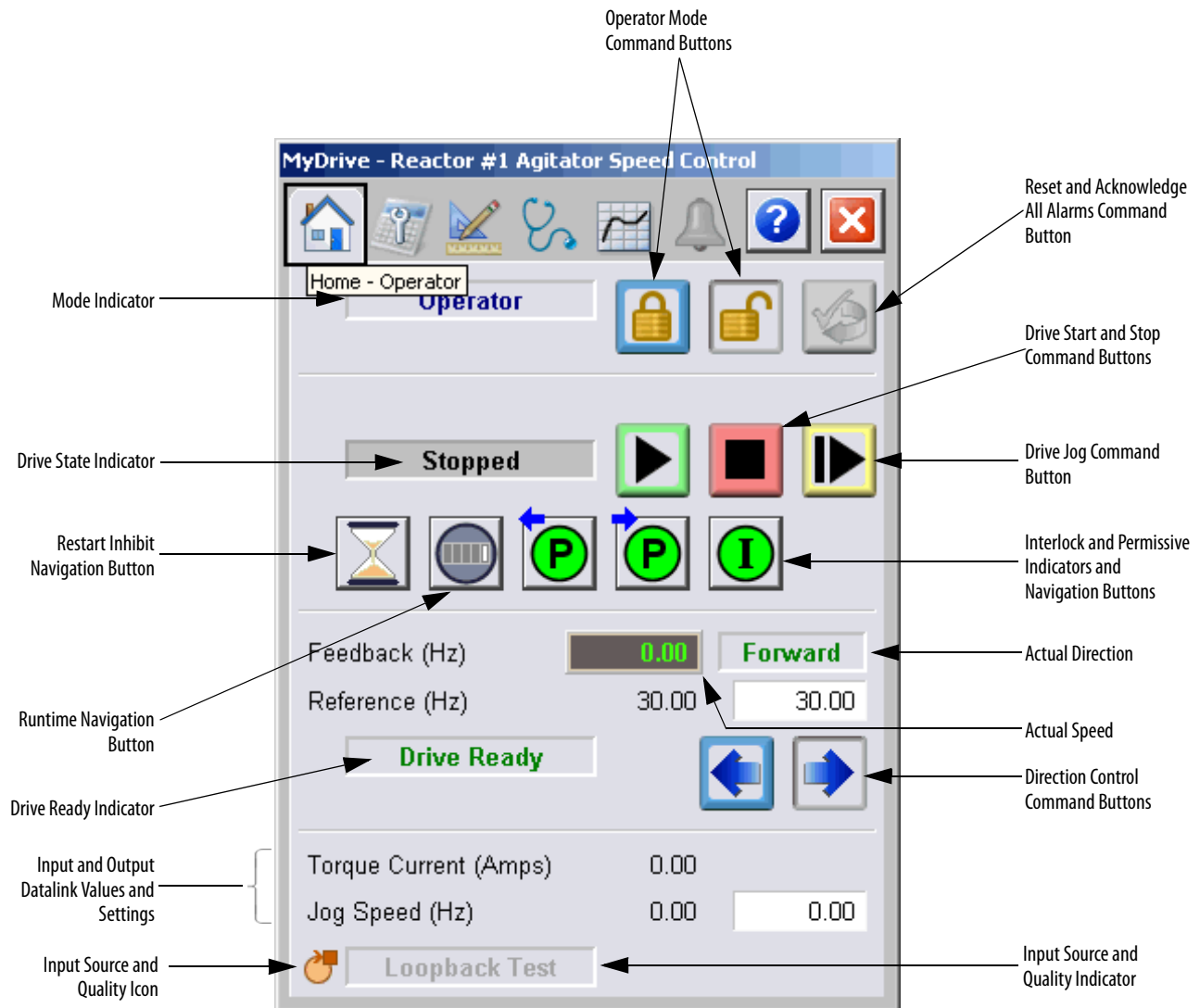
Operator Tab

The Faceplate initially opens to the Operator ('Home') tab. From here, an operator can monitor the device status and manually operate the device when it is in Operator mode.

The Operator tab shows the following information:

- Current mode (Program, Operator, Override, Maintenance, or Hand)
- Requested Mode indicator (appears only if the Operator or Program mode has been superseded by another mode)
- Drive State (Stopping, Stopped, Starting, Running, Disable, or I/O Fault)
- The Drive Motion State (Accelerating, Decelerating, or At Speed)
- The Drive Ready Indicator (Drive Ready, Drive Not Ready, or Drive Faulted)
- Actual Speed
- Actual Direction (appears only if the drive is configured for running reverse)
- Requested Speed
- Requested Direction (appears only if the drive is configured for running reverse)
- Interlock and Permissive states

- Input Datalink Value (appears only if the drive is configured to provide an Input Datalink)
- Output Datalink setting (appears only if the drive is configured to provide an Output Datalink)
- Input Source and Quality indicator (See 'SrcQ' in the Output parameters table on [page 24](#) for details).



IMPORTANT The Input Datalink (Torque Current in figure above) must be enabled on page 6 of the Engineering tab for this field to be visible. (See [Engineering Tab Page 6 on page 63.](#))

The following table shows the functions included on the Operator tab.

Table 13 - Operator Tab Description

Button	Action	Security Required
	Click to release Operator mode lock.	Manual device operation (Code B)
	Click to acquire from Program and lock in Operator mode.	
	Click to request Program mode.	
	Click to request Operator mode.	
	Click to reset and acknowledge all alarms.	Acknowledge alarms (Code F)
	Click to start motor in the forward direction or change direction from reverse to forward.	Normal Operation of Devices (Code A) Available in Operator or Maintenance mode
	Click to stop motor.	
	Click to jog drive.	
	Click to choose forward direction.	
	Click to choose reverse direction.	
	Click to open Interlocks faceplate.	
	Click to open Forward Permissives faceplate.	None
	Click to open Reverse Permissives faceplate.	
	Click to open Restart Inhibit faceplate.	

Table 13 - Operator Tab Description

Button	Action	Security Required
	Click to open Run Time faceplate.	None
Operator Speed Reference Setting Data Entry	Enter the Speed Reference for use in Operator or Maintenance mode. This entry is available in all modes if Bumpless Program/Operator transition is not selected on the on screen.	Normal Operation of Devices (Code A)
Operator Output Datalink Setting Data Entry	Enter the Output Datalink Setting for use in Operator or Maintenance Mode. This entry is available in all modes if Bumpless Program/Operator Transition is not selected on the configuration screen. IMPORTANT: The Output Datalink must be enabled on page 6 of the Engineering tab for this field to be visible. (See Engineering Tab Page 6 on page 63.) The use of this entry is determined by drive configuration and/or by the code that uses the Out_Datalink parameter of this instruction.	

The Operator tab has buttons to open the faceplate of the source object used as interlock or permissive (often this is a P_Intlk interlock object or P_Perm permissive object). When the P_VSD instruction does not have associated Permissive or Interlock instructions, the Permissive and Interlock buttons revert to indicators.

The Operator tab also has buttons to open the Restart Inhibit and Run Time faceplates if the valve is configured to use the P_ResInh or P_RunTime objects. When the P_VSD instruction does not have associated P_ResInh or P_RunTime instructions, the Start Inhibit and Run Time buttons are not displayed.

Refer to these publication for more information:

- Rockwell Automation Library of Process Objects: Interlock with First Out and Bypass (P_Intlk) Reference Manual, publication [SYSLIB-RM004](#)
- Rockwell Automation Library of Process Objects: Permissives with Bypass (P_Perm) Reference Manual, publication [SYSLIB-RM007](#)
- Rockwell Automation Library of Process Objects: Restart Inhibit for Large Motor (P_ResInh) Reference Manual, publication [SYSLIB-RM009](#).
- Rockwell Automation Library of Process Objects: RunTime and Starts (P_RunTime) Reference Manual, publication [SYSLIB-RM010](#).

One of these symbols appears to indicate the described interlock or permissives condition.

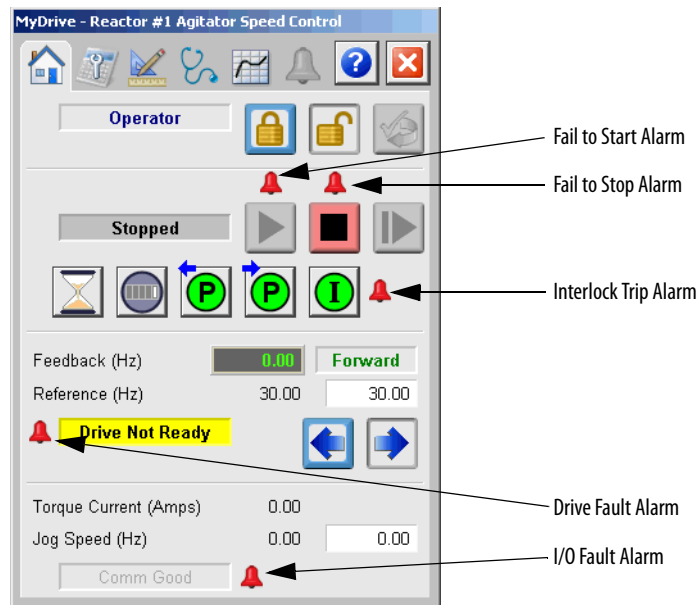
Graphic Symbol		Description
		One or more conditions not OK
		Non-bypassed conditions OK
		All conditions OK, bypass active
		All conditions OK

One of these symbols appears to indicate the described alarm condition. The alarm bell symbol blinks if acknowledgement of an alarm condition is required.

Table 14 - Alarm Status Symbols

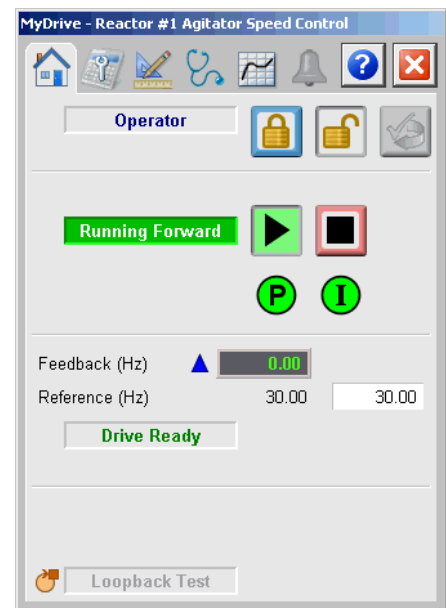
Graphic Symbol	Alarm Status
	In Alarm (Active Alarm)
	In Alarm and Acknowledged
	Out of Alarm but Not Acknowledged
	Alarm Suppressed (by Operator) (Alarm is logged but not displayed)
	Alarm Disabled (by Maintenance)
	Alarm shelved (disabled by Program Logic)

Alarm indicators appear on the Operator tab when the corresponding alarm occurs.



If the drive is configured to not have jog capability, not allow reversing, or not have an Input or Output Datalink, the corresponding features are not displayed.

If the drive is not configured to have Permissives or Interlocks, they appear only as indicators.



Maintenance Tab

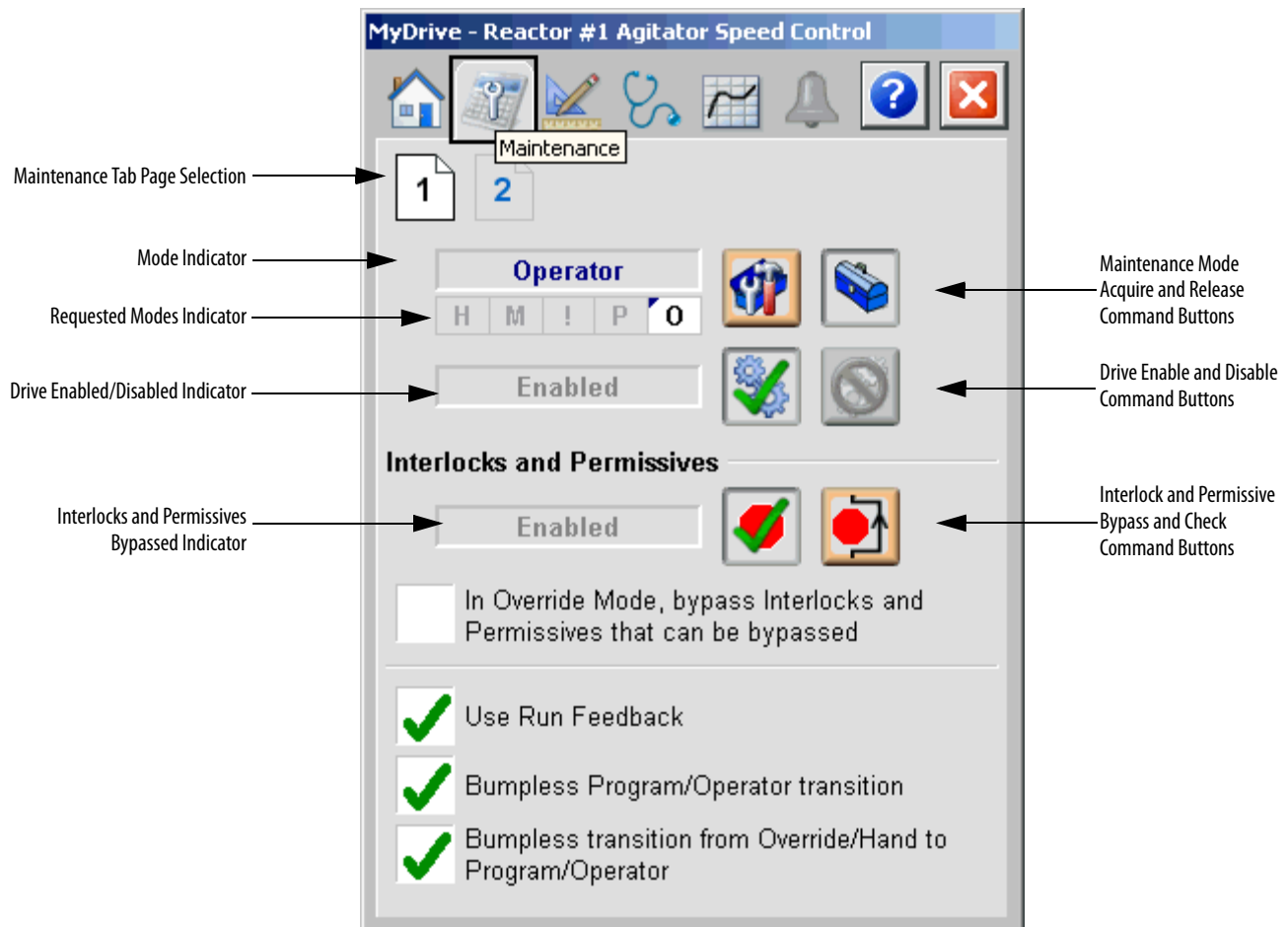
Maintenance personnel use the information and controls on the Maintenance tab to make adjustments to device parameters, troubleshoot and temporarily work around device problems, and disable the device for routine maintenance.

The Maintenance is divided into two pages.

Maintenance Tab Page 1

Page one of the Maintenance tab shows the following information:

- Current mode (Program, Operator, Override, Maintenance, or Hand).
- Requested Modes indicator highlights all of the modes that have been requested. The leftmost highlighted mode is the active mode.
- Whether the motor is enabled or disabled.
- Interlock and Permissive Bypassed/Enabled indicator.



The following table shows the functions on page one of the Maintenance tab.

Table 15 - Maintenance Tab Page 1 Description

Function	Action	Security	Configuration Parameters
	Click to release motor from Maintenance mode	Equipment Maintenance (Code C)	None
	Click to place motor in Maintenance mode		
	Click to enable motor		
	Click to disable motor		
	Click to enable checking of all interlocks and permissives	Disable alarm Bypass Permissives and Interlocks (Code H)	Cfg_OvrPermIntlk
	Click to bypass checking of bypassable interlocks and permissives		
In Override mode, bypass Interlocks and Permissives that can be bypassed	Check to bypass (in Override mode) bypassable interlocks and permissives		
Use Run Feedback	Check to have the instruction use the run feedback to check for motor fail to start or fail to stop. IMPORTANT: This option is available only if 'Motor has Run Feedback' on page 2 of the Engineering tab is checked. (See Engineering Tab Page 2 on page 56.)	Equipment Maintenance (Code C)	Cfg_UseRunFdbk
Bumpless Program/Operator Transition	Check to have Program settings such as Speed Reference track Operator settings in Operator mode, and have Operator settings track Program settings in Program mode.		Cfg_SetTrack
Bumpless Transition from Override/Hand to Program/Operator	Check to have Program and Operator Speed Reference track the Override Speed Reference in Override mode or the actual speed in Hand mode.		Cfg_SetTrackOverdHand

Maintenance Tab Page 2

MyDrive - Reactor #1 Agitator Speed Control

Icons: Home, Maintenance (selected), Settings, Stethoscope, Graph, Bell, Help, Close.

1 2

Fault Reset output pulse time (sec)

Time after 'Start' for feedback before fault (sec)

Time after 'Stop' for feedback before fault (sec)

Maximum Jog Time (sec) 0=unlimited

Speed Reference Limits

Minimum Maximum ← Speed Reference Clamping Limits

Output Datalink Limits

Minimum Maximum ← Output Datalink Clamping Limits

The following table lists the functions of page two of the Maintenance tab.

Table 16 - Maintenance Tab Page 2 Description

Field	Action	Security Required	Configuration Parameters
Fault Reset output pulse time (seconds)	Type the amount of time to hold Out_Reset true to reset a drive fault when a reset command is received.	Configuration and Tuning Maintenance (Code D)	Cfg_ResetPulseT
Time after Start for feedback before Fault (seconds)	Type the amount of time to allow for the drive's run feedback to confirm the drive has started before raising a Fail to Start alarm.		Cfg_FailToStartT
Time after Stop for feedback before Fault (seconds)	Type the amount of time to allow for the drive's run feedback to confirm the drive has stopped before raising a Fail to Stop alarm. TIP: Allow extra time for the drive to decelerate or coast to zero speed before it returns a confirmed Stopped status.		Cfg_FailToStopT

Table 16 - Maintenance Tab Page 2 Description

Field	Action	Security Required	Configuration Parameters
Maximum Jog Time (seconds)	Type the maximum jog time in seconds. 0 = unlimited time.	Configuration and Tuning Maintenance (Code D)	Cfg_MaxJogT
Speed Reference Limits (Minimum and Maximum)	Type the clamping limits for the speed reference. If a speed reference outside this range is entered, the speed is clamped at these limits and Sts_SpeedLimited is asserted.		- Cfg_MinSpdRef - Cfg_MaxSpdRef
Output Datalink Limits (Minimum and Maximum)	Type the clamping limits for the output datalink parameter. If an output datalink value outside this range is entered, the value is clamped at these limits. IMPORTANT: These limits are available only if 'Drive has Output Datalink' on page 6 of the Engineering page is checked. (See Engineering Tab Page 6 on page 63.)		- Cfg_OutputDatalinkMin - Cfg_OutputdatalinkMax

Engineering Tab

The Engineering tab provides access to device configuration parameters and ranges, options for device and I/O setup, displayed text, faceplate-to-faceplate navigation settings, for initial system commissioning or later system changes.

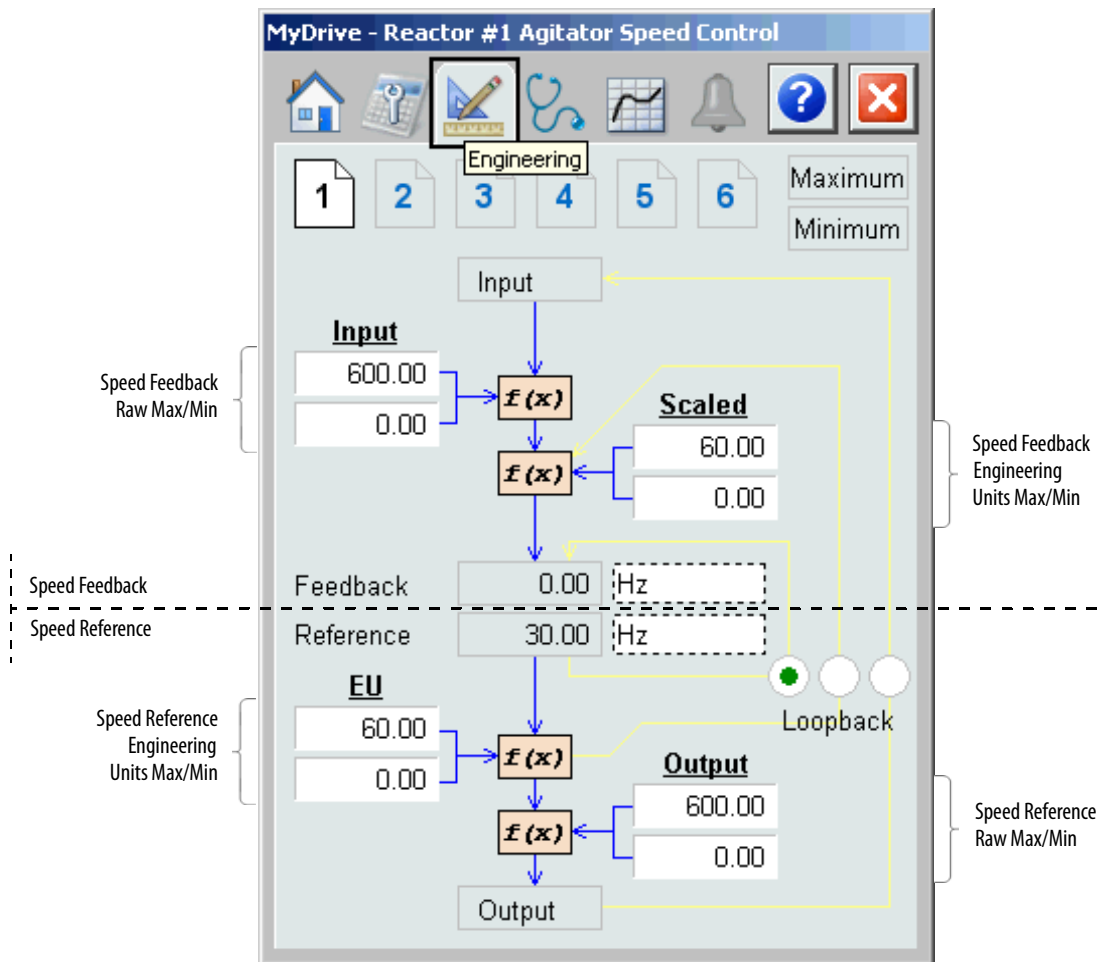
The Engineering tab is divided into six pages.

Engineering Tab Page 1

Page one of the Engineering tab is used to set the Speed Reference (output) scaling, from user Engineering Units used on the faceplate (typically Hz, RPM, or percent) to Raw Units (counts) sent to the drive, and to set the Speed Feedback (input) scaling, from Raw Units as received from the drive (counts) to Engineering Units for display (typically Hz, RPM, or Percent).

For example, with the PowerFlex 70 family of drives, 32,767 counts represents the speed in the Maximum Frequency (MaxFreq) Parameter. For a drive before tuning, this is often 130 Hz. In this case, $32,767 * 60.0 / 130.0 = 15,123$ represents 60 Hz (60% in the figure below).

Check the manual for your drive to determine what count sent to the drive corresponds to your maximum speed reference, and what count received from the drive corresponds to your maximum speed feedback.



IMPORTANT If Speed Feedback is disabled on page 2 of the Engineering tab (See [Engineering Tab Page 2 on page 56](#)), the Speed Feedback part (above dashed line) of the above image is not displayed and the Loopback options are not available.

The following table lists the functions on page 1 of the Engineering tab.

Table 17 - Engineering Tab Page 1 Descriptions

Function	Action	Security	Configuration Parameters
Speed Feedback (Input) Raw Maximum	Enter the raw input count that corresponds to the maximum speed feedback from the drive	Engineering Configuration (Code E)	Cfg_SpeedFdbkRawMax
Speed Feedback (Input) Raw Minimum	Enter the raw input count that corresponds to the minimum speed feedback from the drive. (This value is usually zero.)		Cfg_SpeedFdbkRawMin
Speed Feedback Scaled Maximum	Enter the engineering unit value for the maximum speed feedback from the drive.		Cfg_SpeedFdbkEUMax
Speed Feedback Scaled Minimum	Enter the engineering unit value for the minimum speed feedback from the drive. (This value is usually zero. Do not enter a negative value for reversing drives. Reversing is handled separately.)		Cfg_SpeedFdbkEUMin
Speed Feedback Engineering Units Text	Enter the text of the units of measure of the scaled speed feedback. (This is often Hz, RPM, or Percent.)		Cfg_SpeedFdbkEU
Speed Reference Engineering Units Text	Enter the text of the units of measure of the scaled speed reference. (This is often Hz, RPM, or Percent.)		Cfg_SpeedRefEU
Speed Reference Scaled Maximum	Enter the engineering unit value for the maximum speed reference sent to the drive.		Cfg_SpeedRefEUMax
Speed Reference Scaled Minimum	Enter the engineering unit value for the minimum speed reference sent to the drive. (This value is usually zero. Do not enter a negative value for reversing drives. Reversing is handled separately.)		Cfg_SpeedRefEUMin
Speed Reference (Output) Raw Maximum	Enter the raw output count that corresponds to the maximum speed reference sent to the drive.		Cfg_SpeedRefRawMax
Speed Reference (Output) Raw Minimum	Enter the raw output count that corresponds to the minimum speed reference sent to the drive. (This value is usually zero.)		Cfg_SpeedRefRawMin

Table 17 - Engineering Tab Page 1 Descriptions

Function	Action	Security	Configuration Parameters
Simulated Loopback Method Selection	Select the option that corresponds to how the speed feedback for the drive is to be determined from the speed reference when the drive is being simulated (Inp_Sim = 1). Click the left Loopback option to copy the speed reference in engineering units to the speed feedback. (The simulated feedback is ramped to act like a drive accelerating or decelerating.) Use this if the speed reference and speed feedback use the same scaling parameters Click the middle Loopback option to scale the simulated feedback from the speed reference engineering unit range to the speed feedback engineering unit range. Use this setting if the speed reference and speed feedback have different engineering ranges (for example, percent for reference and Hz for feedback), but the maximum reference (for example, 100%) corresponds to the maximum feedback (for example, 3600 RPM). Click the right Loopback option to scale the speed reference to raw units, scale the speed reference units to speed feedback raw units, and scale to speed feedback engineering units. Use this setting if the reference and feedback ranges do not correspond.	Engineering Configuration (Code E)	Cfg_SimScaleEU

TIP

The P_VSD instruction supports reverse scaling. Either the raw (input) or engineering (scaled) range can be reversed (maximum less than minimum).

Engineering Tab Page 2

MyDrive - Reactor #1 Agitator Speed Control

Engineering

1 2 3 4 5 6 O P M ...

Reactor #1 Agitator Speed Control

Label: Agitator Speed

Tag: MyDrive

Forward Text: Forward

Reverse Text: Reverse

Configure Description, Label, Tag, Forward Text, and Reverse Text

☒ Drive has Run Feedback

☒ Drive has Speed Feedback

☒ Use Speed Feedback > 0 to imply running if Run Feedback not used.

☒ Clear Program commands upon receipt

☐ Operator command resets fault

The following table lists the functions on page 2 of the Engineering tab.

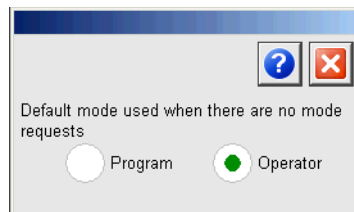
Table 18 - Engineering Tab Page 2 Descriptions

Function	Action	Security	Configuration Parameters
	Click to navigate to the Mode Configuration display.	None	See Mode Configuration display on page 57 .
Drive Description	Type a Description of the drive that appears in the title bar of the faceplate.	Engineering Configuration (Code E)	Cfg_Desc
Label	Type a Label for the drive that appears on the graphic symbol.		Cfg_Label
Tag	Type a Tag for the drive that appears in the title bar of the faceplate and in the Tooltip.		Cfg_Tag
Forward text	Type a name for forward direction.		Cfg_FwdText
Reverse Text	Type a name for reverse direction.		Cfg_RevText

Table 18 - Engineering Tab Page 2 Descriptions

Function	Action	Security	Configuration Parameters
Drive has Run Feedback	Check if the drive provides a run feedback signal. This enables feedback checking for Fail to Start and Fail to Stop. Clear this checkbox if there is no run feedback. IMPORTANT: Checking this places the device in Maintenance Bypass unless 'Use Run Feedback' on page 1 of the Maintenance tab is checked. (See Maintenance Tab on page 49.)	Engineering Configuration (Code E)	Cfg_HasRunFdbk
Drive has Speed Feedback	Check if the drive provides speed feedback on Inp_SpeedFdbk. IMPORTANT: Checking this option enables the next configuration setting and the Output Datalink Limits on page 2 of the Maintenance tab. (See Maintenance Tab Page 2 on page 51.)	Engineering Configuration (Code E)	Cfg_HasSpeedFdbk
Use Speed Feedback >0 to imply running if Run Feedback is not used	Check if Speed feedback greater than zero is used to signify the drive is running. IMPORTANT: This configuration setting is available only if the previous configuration setting is checked.		Cfg_UseSpeedFdbk
Clear Program Commands on Receipt	Check to have the P_VSD instruction clear Program commands (PCmd) as soon as they are received (default).		Cfg_PCcmdClear
Operator command resets fault	Check to have a new operator drive command reset faults. Clear this checkbox for 'reset required' to clear fault.		Cfg_OCcmdResets

Mode Configuration Display

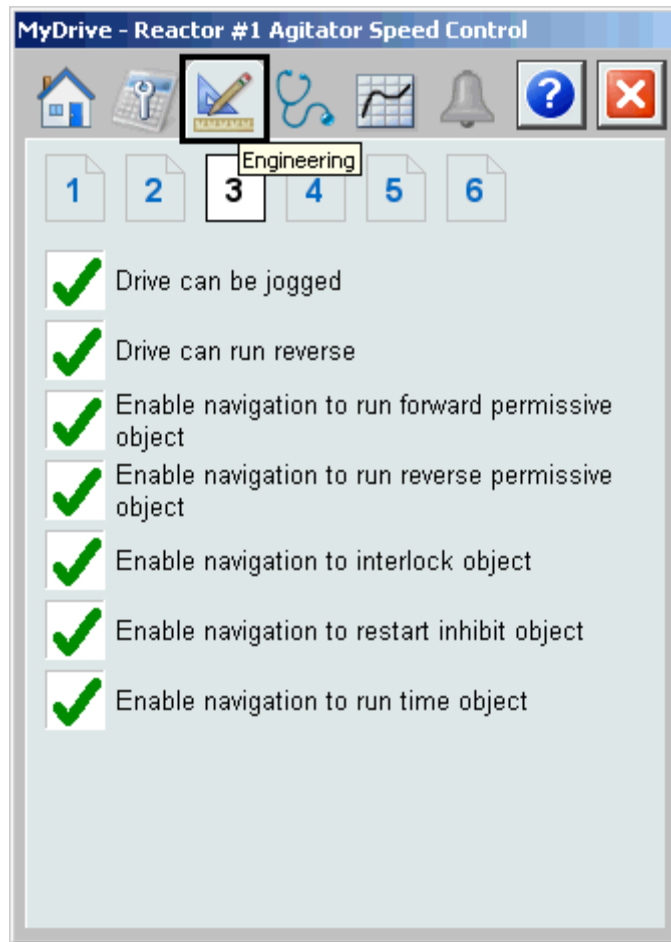


This display lets you select the default mode for the object by selecting the appropriate mode.

IMPORTANT If no mode is being requested, changing the default mode changes the mode of the instruction.

You must have FactoryTalk View security code E to select the default mode on this display.

Engineering Tab Page 3



The following table lists the functions on page 3 of the Engineering tab.

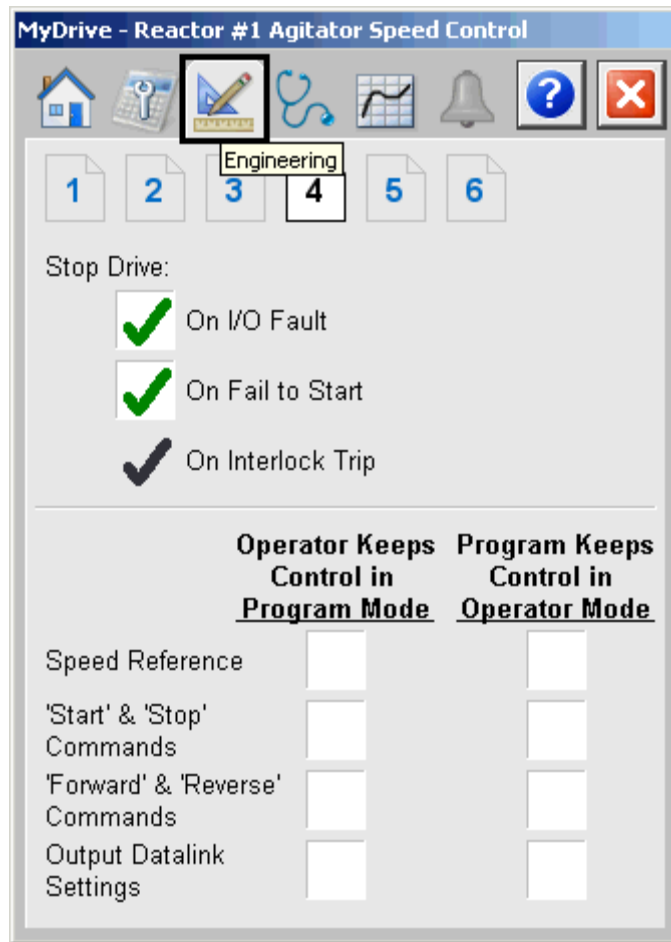
Table 19 - Engineering Tab Page 3 Descriptions

Function	Action	Security	Configuration Parameters
Drive can be jogged	Check to make the Jog command button visible on the Operator tab and enable the drive to be jogged from the faceplate.	Engineering Configuration (Code E)	Cfg_HasJog
Drive can run reverse	Check to make the forward and reverse direction command buttons visible on the Operator tab and enable the drive to run forward or reverse.		Cfg_HasReverse
Enable navigation to run Forward Permissive object	Check if a permissive object is connected to Inp_FwdPermOK. The Permissive indicator becomes a button that opens the permissive faceplate. IMPORTANT: The name of the Permissive object in the controller must be this object's name with the suffix '_FwdPerm'. For example, if your P_VSD object has the name 'Drive123', then its Permissive object must be named 'Drive123_FwdPerm'.		Cfg_HasFwdPermObj

Table 19 - Engineering Tab Page 3 Descriptions

Function	Action	Security	Configuration Parameters
Enable navigation to run Reverse Permissive object	Check if a permissive object is connected to Inp_RevPermOK. The Permissive indicator becomes a button that opens the permissive faceplate. IMPORTANT: The name of the Permissive object in the controller must be this object's name with the suffix '_RevPerm'. For example, if your P_VSD object has the name 'Drive123', then its Permissive object must be named 'Drive123_RevPerm'.	Engineering Configuration (Code E)	Cfg_HasRevPermObj
Enable navigation to Interlock object	Check if an interlock object is connected to Inp_IntlkOK. The Interlock indicator becomes a button that opens the interlock faceplate. IMPORTANT: The name of the Interlock object in the controller must be this object's name with the suffix '_Intlk'. For example, if your P_VSD object has the name 'Valve123', then its Interlock object must be named 'Drive123_Intlk'.		Cfg_HasIntlkObj
Enable navigation to Restart Inhibit object	Check if a restart inhibit object is connected. The button that opens the Restart Inhibit faceplate appears. IMPORTANT: The name of the Restart Inhibit object in the controller must be this object's name with the suffix '_ResInh'. For example, if your P_VSD object has the name 'Drive123', then its Restart Inhibit object must be named 'Drive123_RunTime'.		Cfg_HasResInhObj
Enable navigation to Run Time object	Check if a runtime object is connected. The button that opens the Run Time faceplate appears. IMPORTANT: The name of the Run Time object in the controller must be this object's name with the suffix '_RunTime'. For example, if your P_VSD object has the name 'Drive123', then its Run Time object must be named 'Drive123_RunTime'.		Cfg_HasRunTimeObj

Engineering Tab Page 4



The following table lists the functions on page 4 of the Engineering tab.

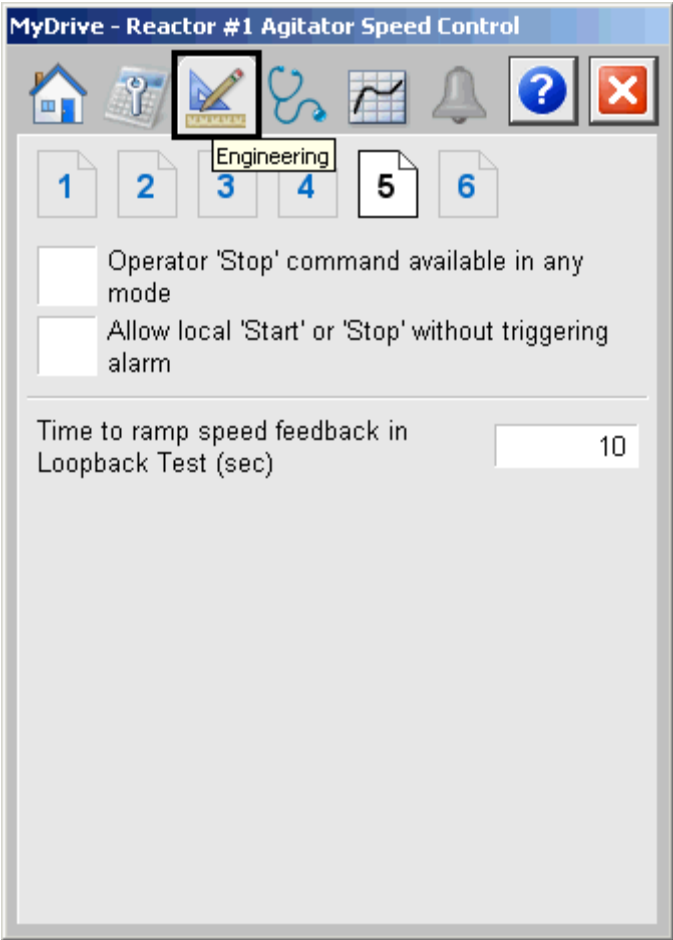
Table 20 - Engineering Tab Page 4

Function	Action	Security	Configuration Parameter
Stop Drive on I/O Fault	Check to stop the drive if an I/O Fault is detected. Clear this checkbox to only show the I/O Fault Status/Alarm and not stop the drive if an I/O Fault is detected.	Engineering Maintenance (Code E)	Cfg_ShedOnIOFault
Stop Drive on Fail to Start	When the bit is on and a motor Fail to Start is detected, the drive is stopped. A reset is required before another start can be attempted. If the bit is off and a drive Fail to Start is detected, the instruction sets only the Sts_FailToStart status (and the Alm_FailToStart alarm, if so configured). The outputs are not changed, so the instruction continues to start the drive.		Cfg_ShedOnFailToStart
Stop Drive on Interlock Trip	The drive always stops on an Interlock trip. This item cannot be unchecked. It is displayed as a reminder that the Interlock Trip function always stops the drive.	N/A	None

Table 20 - Engineering Tab Page 4

Function	Action	Security	Configuration Parameter
Speed Reference - Operator keeps control in Program Mode	Check to keep control of the drive Speed Reference with the Operator, even if the instruction is in Program mode. Clear this checkbox to have control of the drive Speed Reference follow the Instruction mode.	Engineering Maintenance (Code E)	Cfg_OperKeep.0
Speed Reference - Program keeps control in Operator Mode	Check to keep control of the drive Speed Reference with the Program, even if the instruction is in Operator mode. Clear this checkbox to have control of the drive Speed Reference follow the Instruction mode.		Cfg_ProgKeep.0
Start & Stop Commands - Operator keeps control in Program Mode	Check to keep the drive Start, Stop, and Jog (if used) commands with the Operator, even if the instruction is in Program mode. Clear this checkbox to have control of the drive Start, Stop, and Jog follow Instruction mode.		Cfg_OperKeep.1
Start & Stop Commands - Program keeps control in Operator Mode	Check to keep control of the drive Start and Stop commands with the Program, even if the instruction is in Operator mode. IMPORTANT: The Program cannot Jog the drive, even if Jogging is enabled. Clear this checkbox to have control of the drive Start, Stop, and Jog follow Instruction mode.		Cfg_ProgKeep.1
Forward & Reverse - Operator keeps control in Program Mode	Check to keep control of the drive Forward and Reverse commands, if used, with the Operator, even if the instruction is in Program mode. Clear this checkbox to have control of the drive Forward and Reverse commands follow the Instruction mode.	Engineering Maintenance (Code E)	Cfg_OperKeep.2
Forward & Reverse - Program keeps control in Operator Mode	Check to keep control of the drive Forward and Reverse commands (if used) with the Program, even if the instruction is in Operator mode. Clear this checkbox to have control of the of the drive Forward and Reverse commands follow the Instruction mode.		Cfg_ProgKeep.2
Output Datalink - Operator keeps control in Program Mode	Check to keep control of the Output Datalink Setting (if used) with the Operator, even if the instruction is in Program mode. Clear this checkbox to have control of the Output Datalink setting follow the Instruction mode.		Cfg_Cfg_OperKeep.3
Output Datalink - Program keeps control in Operator Mode	Check to keep control of the Output Datalink setting (if used) with the Program, even if the instruction is in Operator mode. Clear this checkbox to have control of the Output Datalink setting follow the Instruction mode.		Cfg_Cfg_ProgKeep.3

Engineering Tab Page 5



The following table lists the functions on page 5 of the Engineering tab.

Table 21 - Engineering Tab Page 5 Description

Function	Action	Security	Configuration Parameters
Operator 'Stop' command available in any mode	Check (= 1) so that the OCmd_Stop has priority and is accepted at any time. Clear this checkbox (= 0) so that the OCmd_Stop works only in Operator or Maintenance mode.	Engineering Maintenance (Code E)	Cfg_OperStopPrio
Allow local 'Start' or 'Stop' without triggering alarm	Check (= 1) to allow local start/stop without an alarm. Clear this checkbox (= 0) to start/stop from the HMI or program only.		Cfg_AllowLocal
Time to ramp speed feedback in Loopback Test (Seconds)	Enter the time, in seconds, to ramp speed feedback when in Simulation.		Cfg_SimRampT

Engineering Tab Page 6

MyDrive - Reactor #1 Agitator Speed Control

Home | Engineering | ? | X

1 2 3 4 5 6

Input Datalink — Torque Current

☒ Drive has Input Datalink

	<u>Input</u>		<u>Scaled</u>
Maximum	4095.00	$f(x)$	409.50
Minimum	0.00		0.00
		Units	Amps

Output Datalink — Jog Speed

☒ Drive has Output Datalink

	<u>Scaled</u>		<u>Output</u>
Maximum	409.50	$f(x)$	4095.00
Minimum	0.00		0.00
		Units	Hz

Input Datalink Raw Max/Min

Input Datalink Scaled Max/Min

Output Datalink Scaled Max/Min

Output Datalink Raw Max/Min

The following table lists the functions for page 6 of the Engineering tab.

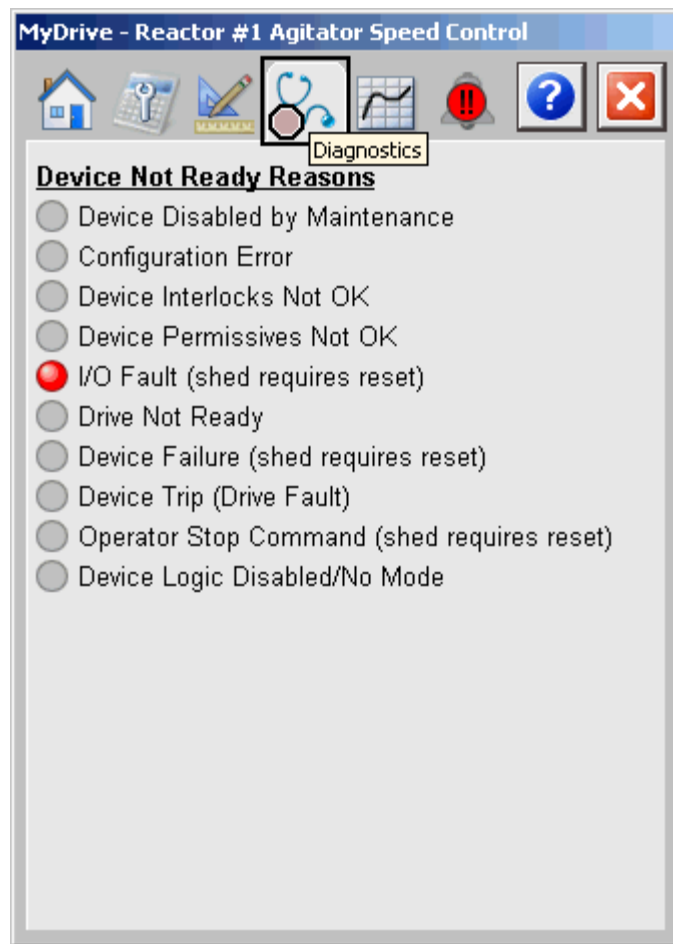
Table 22 - Engineering Tab Page 6 Description

Function	Action	Security	Configuration Parameter
Drive has Input Datalink	Check if Inp_Datalink is used. This makes the Input Datalink configuration and operation functions visible.	Engineering Maintenance (Code E)	Cfg_HasInpDatalink
Input Datalink	Type the text to display for the Input Datalink's label.		Cfg_InpDataLinkLabel
Input Datalink Raw (Input)	Configure the minimum and maximum raw (from the drive) units for the Input Datalink.		• Cfg_InpDatalinkRawMin • Cfg_InpDatalinkRawMax
Input Datalink Scaled (Scaled)	Configure the minimum and maximum scaled values for the Input Datalink in Engineering Units.		• Cfg_InpDatalinkEUMin • Cfg_InpDatalinkEUMax
Input Units	Type the text to display for the Input Datalink's units of measure.		Cfg_InpDataLinkEU
Drive has Output Datalink	Check if Out_Datalink is used. This makes the Output Datalink configuration and operation functions visible.		Cfg_HasOutDatalink
Output Datalink	Enter the text to display for the Output Datalink's label.		Cfg_OutDataLinkLabel
Output Datalink Scaled (Scaled)	Configure the minimum and maximum scaled values for the Output Datalink in Engineering Units.		• Cfg_OutDatalinkEUMin • Cfg_OutDatalinkEUMax
Output Datalink Raw (Output)	Configure the minimum and maximum scaled values for the Output Datalink in Raw (to the drive) Units, and enter the text to display for the Output Datalink's label and units of measure.		• Cfg_OutDatalinkRawMin • Cfg_OutDatalinkRawMax
Output Units	Enter the text to display for the Output Datalink's units of measure.		Cfg_OutDataLinkEU

Diagnostics Tab

The Diagnostic tab provides indications that are helpful in diagnosing or preventing device problems, which can include specific reasons a device is 'Not Ready', device warnings and faults, warning and fault history, and predictive/preventive maintenance data.

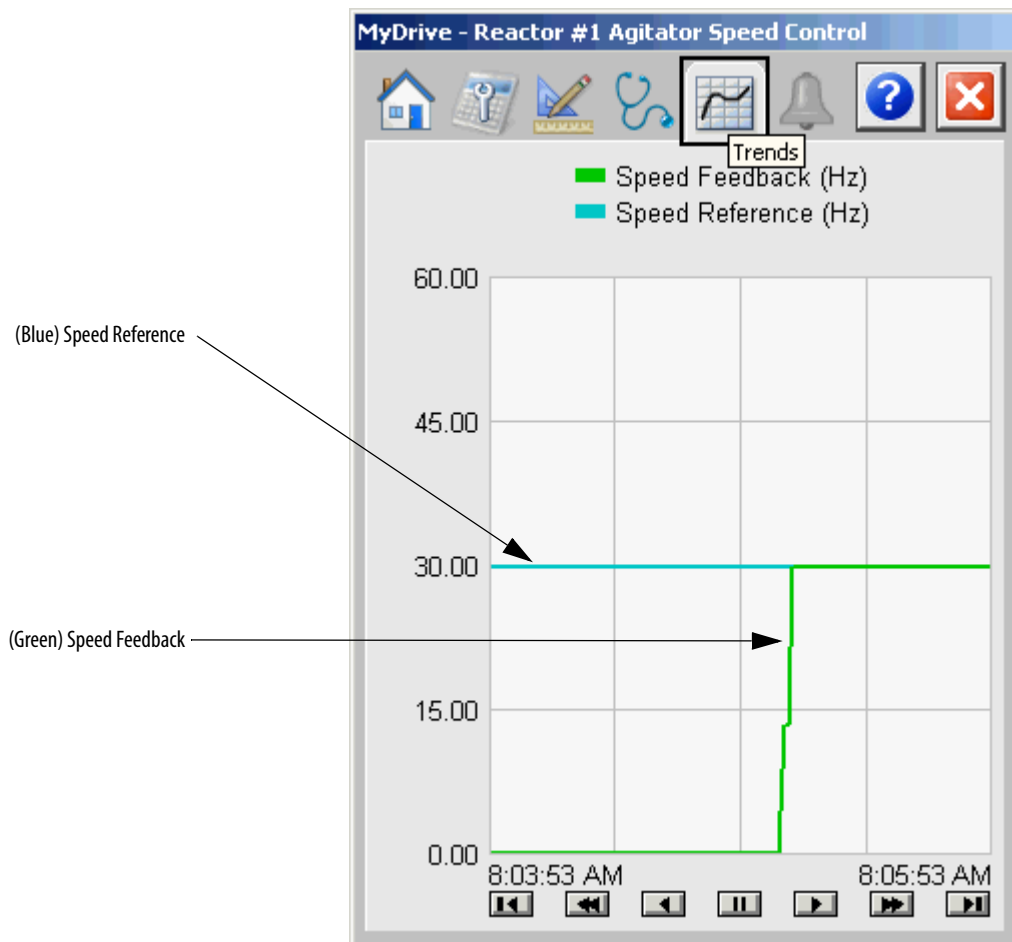
The Diagnostics tab displays possible reasons the device is not ready.



The image above indicates the device is not ready because of an I/O fault. This is a latched shed condition that requires a reset.

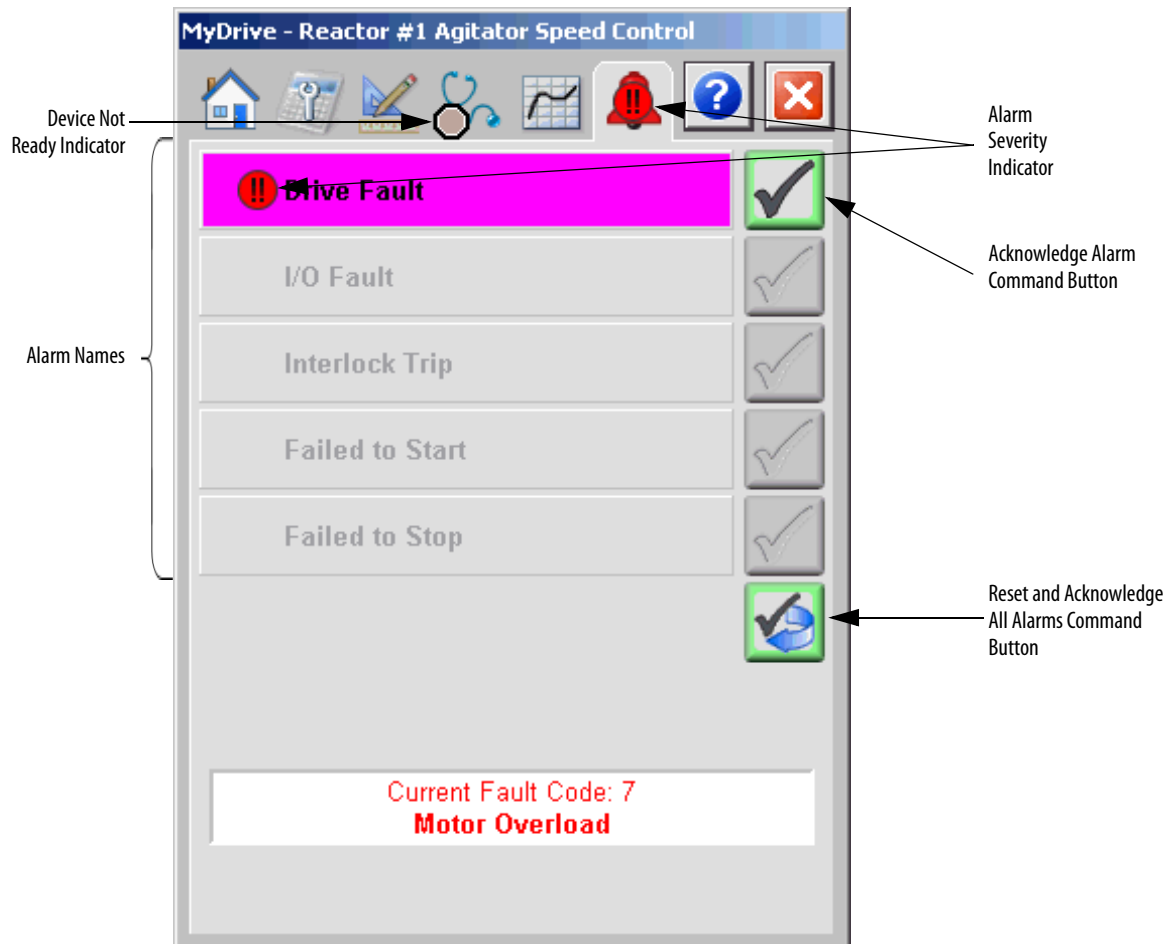
Trends

The Trends tab shows trend charts of key device data over time. These faceplate trends provide a quick view of current device performance to supplement, but not replace, dedicated historical or live trend displays.



Alarms Tab

The Alarms tab displays each configured alarm for the P_VSD instruction. The icon on the tab for the alarms page changes color based on the current active alarms. A blinking alarm icon indicates that one or more alarms must be acknowledged or the device must be reset.



IMPORTANT The 'Failed to Start' and 'Failed to Stop' alarms are available only if 'Drive has Run Feedback' or 'Drive has Speed Feedback' on page 2 of the Engineering tab is checked. (See [Engineering Tab Page 2 on page 56.](#))

Click an alarm name to open the P_Alarm faceplate for that alarm. From the P_Alarm faceplate, you can configure and perform additional operations on the alarm.

If an alarm is active, the panel behind the alarm changes color to match the severity of the alarm. The color of the bell icon at the top of the faceplate shows the highest active alarm's severity, and the icon blinks if any alarm is unacknowledged or requires reset.

The following table shows the colors associated with alarm severity.

Table 23 - Alarm Color Codes

Color	Definition
Magenta	Urgent
Red	High
Yellow	Medium
Blue	Low
White (bell icon)	All alarms have cleared, but one or more alarms are unacknowledged
Background (light gray)	No alarm

The following table shows the functions on the Alarms tab.

Table 24 - Alarms Tab Description

Button	Action	Security
	Click to acknowledge the alarm.	Acknowledge Alarms (Code F)
	Click to reset and acknowledge all alarms.	
Alarm Name	Click an alarm name to display the Alarm Operator faceplate.	

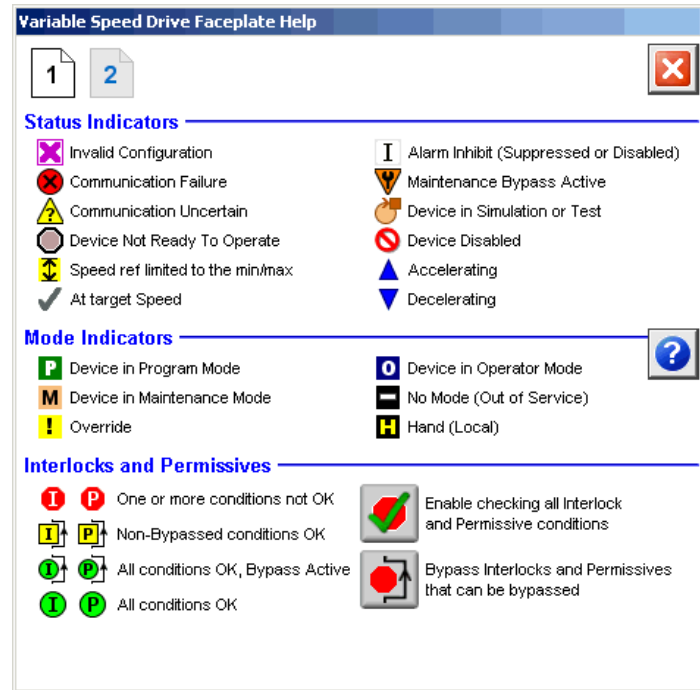
The Reset and Acknowledge All Alarms button is enabled, the panel behind the alarm blinks, and the Alarm Acknowledge button is enabled if the alarm requires acknowledgment. Click the button with the checkmark to acknowledge the alarm.

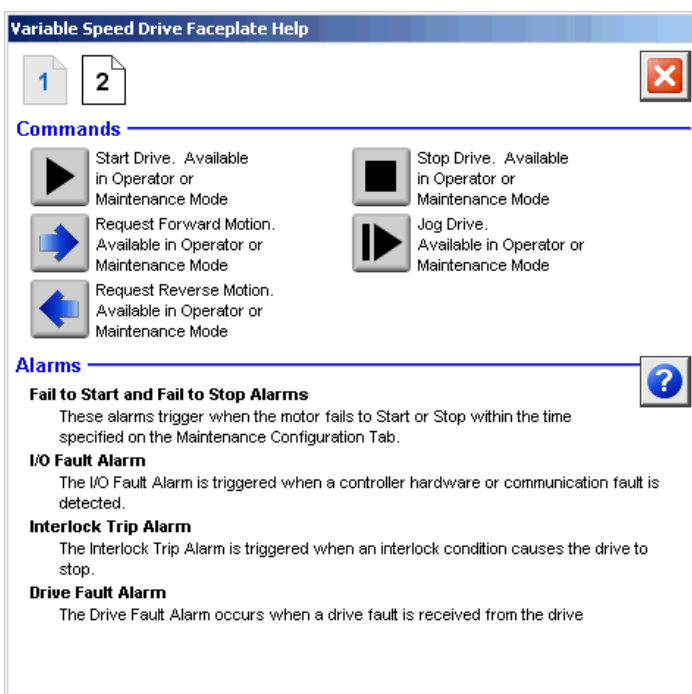
Refer to the Rockwell Automation Library of Process Objects: Common Alarm Mode (P_Alarm) Reference Manual, publication [SYSLIB-RM002](#), for more information.

Variable Speed Drive Faceplate Help

The Faceplate Help is divided into two pages.

Faceplate Help Page 1



Faceplate Help Page 2

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products.

At <http://www.rockwellautomation.com/support> you can find technical and application notes, sample code, and links to software service packs. You can also visit our Support Center at <https://rockwellautomation.custhelp.com/> for software updates, support chats and forums, technical information, FAQs, and to sign up for product notification updates.

In addition, we offer multiple support programs for installation, configuration, and troubleshooting. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://www.rockwellautomation.com/services/online-phone>.

Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/rockwellautomation/support/overview.page , or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to help ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication [RA-DU002](#), available at <http://www.rockwellautomation.com/literature/>.

Rockwell Automation maintains current product environmental information on its website at <http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>.

Rockwell Otomasyon Ticaret A.Ş., Kar Plaza İş Merkezi E Blok Kat:6 34752 İçerenköy, İstanbul, Tel: +90 (216) 5698400

www.rockwellautomation.com

Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
Europe/Middle East/Africa: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

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